MAGAZINE

Airborne

NUMBER 100
July - August 1990
AUSTRALIA: $4.20
NEW ZEALAND: $6.20
(Inc. G.S.T.)

AND R.C. MODELS
including AIRCRAFT, BOATS & YACHTS

PLANS:
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ENGINE REVIEW
SAITO FA 300T-TDP

AIRBORNE PLANS LIST LIFTOUT



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Contains MAAA Official Information

NEW GENERATION AEROFLYTE



NEW

Length 1240mm
Wingspan 2500mm
Wing Area 0.54m²
Nominal Weight 1100-1250g
Radio ..... Sanwa 2 channel

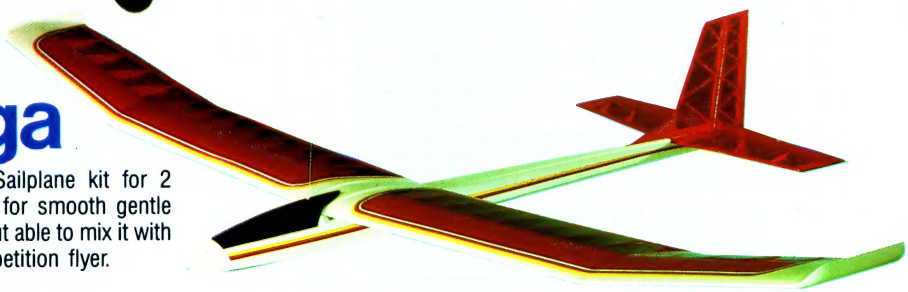
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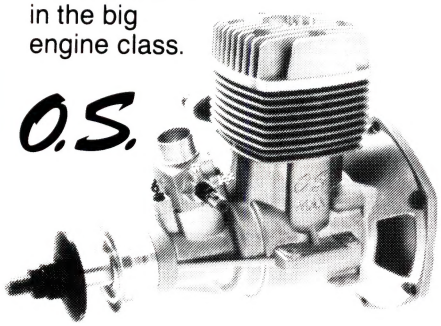
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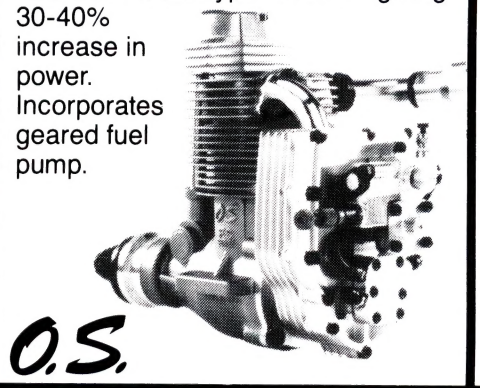
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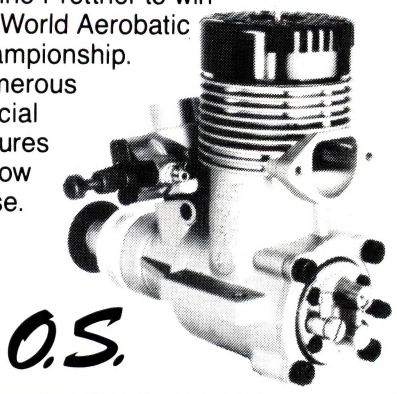
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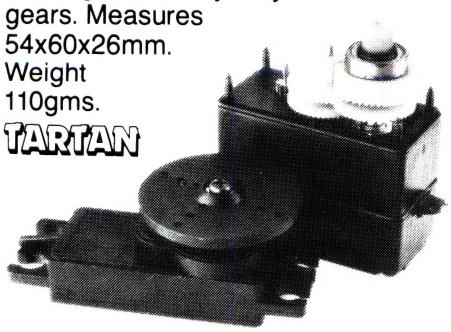
Great performer, comes with Mabuchi 540 motor and folding propeller. Fully built and covered, with strong plastic fuselage.



Wingspan 1,600mm. Fits 7.2V nicad pack and needs 2/3 channel radio.

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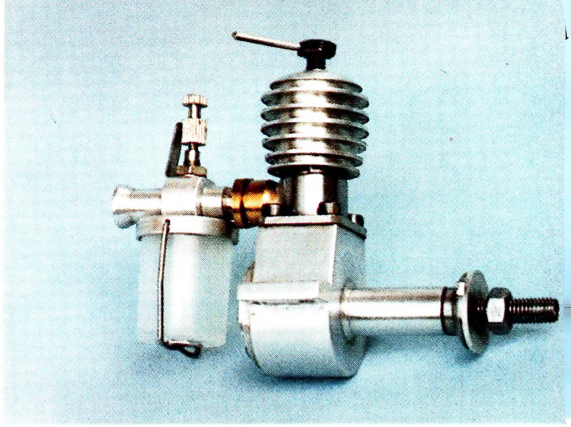
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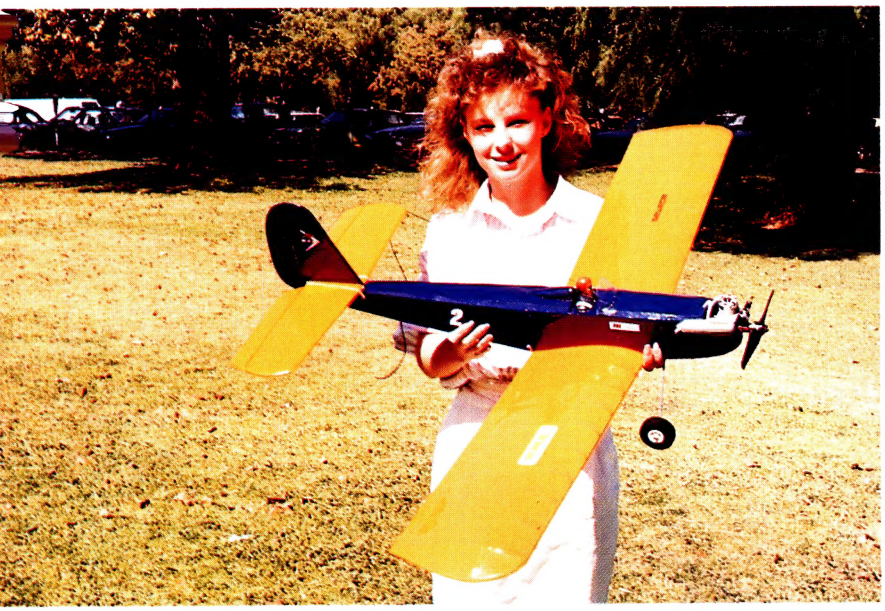
57 Crown Street Richmond 3121.





The fuel tank on this very neat engineering effort by Fred Burman is the cap of a Zap bottle. The engine is the Weaver 1 cc diesel, published in Aeromodeller in 1948. No castings were used; all parts were machined from bar.

Steve Jewell, left on the sticks, as Colin Felmingham prepares to put the Trident on the wind coming off the Southern Ocean near Ceduna. No need for a keyboard out there! Photo by Frank de Piaz. More in the OSW column.



Janelle Davies holds Adamas Two, by Don Howie. Construction article in this issue.

A new version of the sheet wing stunter shown in 1983. The original by Frank Coombes has been modified by Leon Baird and is shown here with Leon's friend, Lee.



At the Rangiora Fly-In, the crowds watched the flying to allow Bill Cooksey to take this photo of Ron Loader's C130E. All built-up construction, wingspan of 4.26 metres and weight of 14.5 kg. Power comes from 4 OS 90 FSRs! Futaba 7 channel gear is used for all controls plus rear door and nav. lights. RNZAF colour scheme done in Dulon lacquer. The young engineer inspecting the rudder loves it!



MAGAZINE
Airborne

NUMBER 100
July - August 1990
AUSTRALIA: $4.20
NEW ZEALAND: $6.20
(Inc. G.S.T.)

ISSN 1030 0090

Published by: ROPOMOD Productions Pty Ltd,
Unit 11, 67 Garden Dve., Tullamarine, Vic., 3043.
Phone: (03) 338 5696 & 330 3740
FAX: (03) 330 3751
General Manager: John Rogers
Editor: Merv Buckmaster
Advertising Manager: John Rogers
Subscription Manager: Joan Buckmaster
Typesetting by: Barinore Productions Pty Ltd
Printed by: Franklin Web, Melbourne.
Distributed by: Network Distribution Co., Melb.

ANNUAL SUBSCRIPTION RATES

(6 issues per year)

	Surface	Air Mail
Australia:	$24.00	$33.00
New Zealand & PNG:	$33.00	$40.00
Other Countries:	$37.00	$52.00

All prices are in Australian currency.

Payment for overseas subscriptions **must** be made by International Bank Draft or Money Order only. Due to Australian banking regulations, personal cheques cannot be accepted.

New subscription orders and renewals should be sent to P.O. Box 30, Tullamarine, Vic., 3043. Renewals will be back-dated to the last issue sent unless otherwise requested.

Back issues may be ordered at $3.00 per copy from the above address.

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Original material should be double or triple spaced with a wide left hand margin. Photographs may be colour or black and white prints. Diagrams should be inked on tracing paper. Photos will be returned **only** if a stamped, self-addressed envelope is supplied. Material should be sent to:

The Editor, RMB 1798, Benalla, Vic., 3673.
Payment must be negotiated with the General Manager.

DEADLINES:

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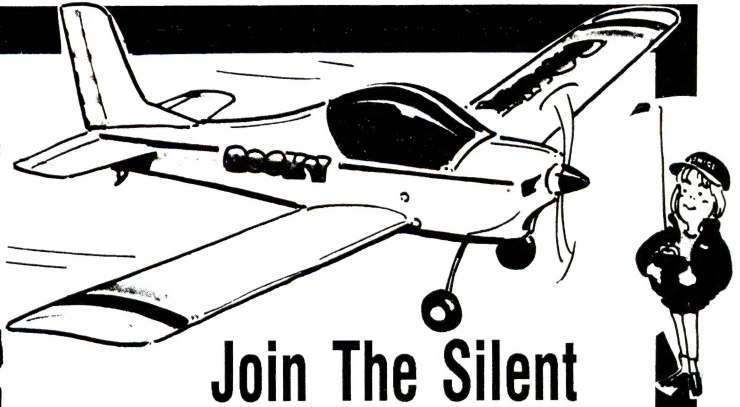
COVER STORY

As Airborne progresses through the milestone of our 100th issue, it's only fitting that a portrait of a modeller of the future be our cover shot this issue. Lachlan Knowles, aged four, is the grandson of Canberra modeller, Doug Stewart. Doug's Spitfire MK14 is from Brian Taylor plans. 6 Channel operation, .61 HP engine, fully detailed cockpit, exhaust/muffler system through starboard exhaust port, while the radio is a JR Computer. Ron's club placed a flying "embargo" on the model until this shot was taken. So much for flying confidence! Photo by Heidi Smith of Canberra.

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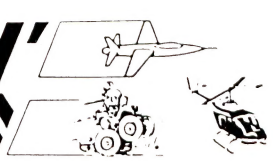
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From the Cockpit

NUMBER 100. SO WHO'S COUNTING?

This is our 100th issue! So what? It's no big deal! Model Builder started at about the same time as AIRBORNE, and it is up to 222. And it has 110 pages to our 104. Established magazines such as AeroModeller have produced 236 issues in the same time. Why the hype about 100 issues?

Well, the number really signifies success, in spite of a struggle. No. 99 also shows the same thing, and so will No. 101, but there is some instrinsic magic about number 100. It has been a long time coming! I won't go into details about the history of AIRBORNE. I was unable to trace Lyal Bailey who started the magazine with the late Dave O'Brien early in 1971. Lyal was more a photographer than a modeller. Dave was the aeromodeller and was killed in the crash of a Pitts S2A some time after the magazine had been taken over by the Shennan brothers.

More history is given in previous editorials that are referred to in Mel Gillott's column. There are only a few points that I want to add to the story, mainly in recognition of significant contributions, since it has been the contributors who have made AIRBORNE what it is. I was lucky to be able to find very good columnists, and the quality basis attracted other good contributions.

The longest-running column has been Flight Analysis which I began in No. 13 of October 1974, and which set the standard for quality when Martin Simons took it over.

The electric flight column actually began in No. 17 in December 1974 with a letter from Jack Black, who began the regular series soon after. It was probably the earliest electric column in a modelling magazine.

The content of the magazine was further enhanced when Brian Winch and Mel Gillott joined the team. At the present time all the columnists are top modellers, highly regarded here and overseas.

RC cars were featured as race reports occasionally until a regular column was started by David Hyde in No. 40, August 1980. Soon there were three RC car columns and they continued till No. 83 in September 1987 when John began the specialist car magazine, Dirt & Track.

I was particularly pleased with the issues that featured the subject of the main plan and construction article on the cover. This began with Hans Heck's Pucara in No. 49, Feb-Mar 1982, peaked with the internationally acclaimed article about the Winter Special on No. 64 (July-August '84) and ended with Steve Bode's Laser in No. 66.

The most disappointing feature is the blank spaces in the early issues, resulting from the printer not informing me that the typeset material was insufficient. Once I took over the paste-up that did not happen, and since then I have had the opposite problem: too much material for the number of pages.

One final comment seems appropriate. The struggle to keep the magazine going has been due partly to the small population of Australia. After all, The United Kingdom has 70 million and the USA 270 million people. The situation here has been constrained further by lack of support from some Aussie modellers who choose to neglect it because it is Australian. If there is nothing in it to interest them they are under no oblligation to give their support, otherwise the converse should govern their choice. In either case, anything that the readers may regard as unsatisfactory may be brought to the attention of the management. We will listen because it is your magazine.

PROP-ERLY DONE

I've just acquired another Bolly prop, this time a 12 x 6, 3-bladed tractor in carbon fibre. It is very impressive: very solid, very stiff and beautifully sculptured. Les could be a modern day Rodin! I like Bolly props, but I don't buy them just because of that. They are fairly expensive so I obtain them when there is a good reason to do so. One such reason is a gain in performance but, not being a contest flyer, my reason was to try and tame a big diesel I have that has been suffering from a lot of vibration. I had almost tamed it with a Bolly 2 blader, but the 3-blader did the trick. Beaudy!

MODEL AVIATION HEADQUARTERS

The May 1990 issue of Model Aviation proclaimed that the AMA has boughtabout 1200 acres in Muncie, near Delaware in Indiana, for their new headquarters, museum and international flying site. There is a possibility of acquiring the adjoining airport, so the AMA is setting the standards for aeromodelling, once again. We shall have to do the same ..... some time.

PHOTOGRAPHY FOR MAGAZINE REPRODUCTION

Exerpts from the article by Norman Kennedy in Australian Gliding Magazine, May 1990, page 20. With permission of the editor.

The process of using a photo in a printed magazine includes several stages. Firstly the photo, colour or B&W, is re-photographed through a screen and re-printed to produce the screened bromide. This is placed on the paste-up (or artwork) which is photographed, several pages together to produce a large negative, used in turn for the production of the litho plate that is used on the press to do the actual printing. There is some loss of quality at each stage of the process.

To produce the best quality original, the following steps may be taken. Use a quality film such as Ilford FP4, which is B&W. For colour the slower films are better: 100 ISO colour print film is as good as any. Transparencies are for colour cover work; to be used inside a magazine they have to be converted to prints first. For outside photos, particularly in sunlight, fill-in flash should be used. When the sky is cloudy it may not be necessary, but sunglasses should be removed and the photo should be over-exposed by at least one stop.

Colour prints that have light tones and pale colours are much better than those with dark colours, particularly those with reds, browns and greens next to each other. To get greater clarity with stationary objects, use a small aperture (F16), long exposure (¼ second or more) and put the camera on a tripod.



Chas Banhelyi has just kicked the tyre and is about to light the fire, and go! In a Ceres cropduster? Charles is the mover behind the bid for the combined F3A, F3C and F3D World Champs in Australia in 1993. Charles will answer any query about the bid, but if you want details about the Ceres, ask Warwick Gregory at Scale Model Research.



Cliff McIvor tries pattern flying with wires instead of with wire-less control in an interlude at the Kraft Masters 1990. A strong breeze enabled Cliff to go fly a kite, but even with his high wing loading, some ballast was needed. That man sure loves his flying! Chas. B. was nearby with the camera.

SOMETHING THAT .....
..... has nothing to do with Aeromodelling.

Noticed on the back of a letter that crossed the Editor's desk recently:

"By planting trees now, at every opportunity, in places where they may grow undisturbed, Australians in every walk of life can help restore the fine balance of Nature, improve quality of life for all, to help remedy, slowly, the mistakes of the past. It takes at least six fully grown trees to purify the air of the poison fumes put out in a day's use of the family car."

TIME FOR A SPELL

Firstly, a sincere thank you to readers who write in to point out mistakes that appear in the magazine. Some are factual and are corrected in a later issue. Some are deliberate misspellings for the sake of punning, for example, and are surely recognised as such. No apologies for those; modelling is supposed to be fun!

Some are typing errors that escape proofreading; many others are corrected before the deadline calls a halt to the window -dressing. Some spelling errors are the result of using English from different countries. Sooner or later an Editor has to accept that there is more than one form of the English language.

For example, we are all aeromodellers, but some of us fly model aeroplanes and some model airplanes. Similarly, some use aerofoils, others use airfoils. Note that we all fly aerobatics, not airbatics! Or should that be Pattern, perhaps? Propellers have been known as propellors, but they belong to the undefined group of propulsors, not to model aeronautics (airnautics, anyone?) which deals with propellers or airscrews.

Plastic materials have us using molds to shape our models. NO! Not moulds! Those are spots that grow on old bread or neglected jam. You know, of course that our modern engines are Schnuerle ported; with a capital S and the 'u' in the middle.

In No. 98 (p.7) I mentioned Jake's aximorons, the name being a hybrid of "moronic axiom", which suits its application admirably, and maybe Jake's only claim to faim (sorry, fame). The word is a play on oxymoron, which can be found in the Oxford dictionary; also in Webster's lexicon. No doubt it was coined to convey a message. Get the message? The drift, that is.

Okay. If you have accessed all that information, it's time to go flying. I fly, you fly, he flys, she flys, we fly, they fly. Don't be concerned about the flies that buzz around the kitchen door when dinner is cooking. That is, being cooked. One fly is no problem, but many flies are. He flies or she flies; it doesn't matter, they are all flies.

So, when a flyer goes out to fly his model aeroplane (airplane?; well, make that model aircraft!) it doesn't matter if it's English or Double Dutch. In anybody's language, modelling is FUN!

TRANSLATION, NOT TRANSFORMATION

When is a Fokker dee vee eye eye eye not a dee vee eye eye eye? When it is a D7. Geoff Weeks of Narrabundah pointed out that Norm Bell's model shown on the colour page of No. 99 is actually a D7, so I must have miscounted the eyes in the notes that Norm sent me. I know he would not have got it wrong! From now on, please don't put my Latin to the test. When it comes to numerals, I'm an Arab!

And while the taste of shoe leather is in fashion, Geoff Hennig of Hackham and Max Matheson of Bendigo claim that the photo at the top of page 73 in No. 99 is the long-lost Curtiss XP40Q that was mistakenly identified in an earlier issue. In the original batch there were 4 photos from Nick Angove-Rogers, and only 3 captions, so one slip led to the next, and the Seafire photo must be somewhere in the filing system. So far Angove-Rogers - 3; Editor - Nil. Just to balance the situation, the eagle-eyed scale referees named above have received something for their contributions to keep the records straight.

POINTS OF VIEW
What is Good?

"What is the real good?
I asked in morning mood.
Order, said the Law Court;
Knowledge, said the school;
Truth, said the wise man;
Pleasure, said the fool;
Love, said the maiden;
Beauty, said the Page;
Freedom, said the dreamer;
Home, said the sage;
(Flying, said the aeronaut;)
Fame, said the soldier;
Equity, the seer;
Spake my heart full sadly;
The answer is not here.

Then within my bosom
Softly this I heard:
'Each heart holds the secret;
Kindness is the word.' "



Chris Jones with his Grandad's P38. Note the clear features on Chris' face due to the use of fill-in flash. Model is from an MRM kit, has 2 OS 45 FSRs and Rhom retracts. Lionel used a Nikkon FM2 to take the photo.

JUST NOT POSSIBLE

This para must start with a special thank you to the many readers who offered their best wishes for our century, particularly those who sent contributions. Some of those items have been included, some have not. To the contributors whose material still waits for publication, I can only repeat the excuse that there was not enough space for all of it this time. Your help is appreciated. If all your friends and clubmates subscribed to the magazine we might be able to make it bigger.



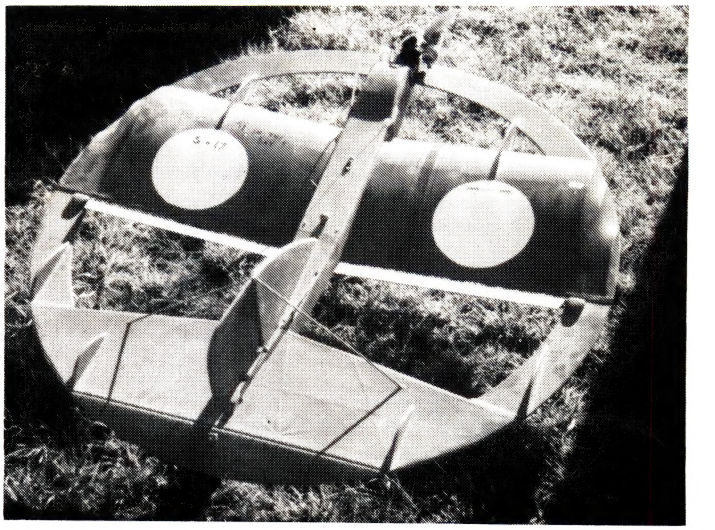
Seen recently at Dalby, Qld., 3 year old Joshua Sims, always helpful, removes the battery pack from his father's Berryloid Winner. With help like this, how can you lose? Borthwick photo.



Ian Ferris with Art Adamisin at Pittsburgh, June '89. Judging from their expressions, someone has just fallen out of the cloverleaf! Art will be accompanied on his visit by his wife, Betty.



At the second Veterans' Gathering, Gordon Burford was given an award for the most popular model. After making thousands of i.c. engines, he now has one that is powered by Burford compressed air! The award was a nicely carved propeller with one clockwise blade and one anti-clockwise blade. At the dinner Ross Woodcock told us his fascinating Avro 504 story.



Another Frank Bryant original. Remember the Butterfly? This one can be elevated to an angle of about 45° and airspeed can be reduced to less than walking pace. Power was an OS 25 FP. Chatting with veterans like Frank was the best part of the weekend. AIRBORNE pic.

Letters to the Editor

Dear Sir,

Reading 'When is a test not a test' in Airborne No. 98 has prompted me to add to the comments made. You are quite correct in pointing out the variables in testing motors; i.e. fuel, plug, weather and so on, not to mention if the engine is well run in.

I would like to point out the problems in quoting a propeller size, or making any sense of the rpm figures. Props often vary from quoted diameter; e.g. many 10 x 6 are about 9.85 inches diameter (250 mm) and some are over the quoted size. Blade area also has an effect on some test reports, especially those that feature thrust measurements. A static thrust measurment is a very inaccurate guide to airborne performance.

The biggest problem in prop comparisons is pitch. The first problem is how to measure and quote pitch. Often pitch is quoted from a fixed position; e.g. at 50 or 75% of the radius, and sometimes it is quoted as an average of numerous measurements taken along the blade. I believe that the most accurate way is to quote the peak (highest) pitch measurement, but excluding the very tip. For most props that measurement will be at 70 to 90% of the radius.

To complicate matters for the average modeller some manufacturers quote pitches as 6 to 10 or 7 + 2, which only confuses the issue. Even worse is the total inaccuracy in some quoted sizes. For props to be half an inch from the quoted pitch is not unusual, and to be 2 inches out is not unheard of. How is anyone supposed to make sense of test figures?

However, for manufacturers to quote a prop's exact size is not practical. We would all soon go crazy if all props were quoted to the nearest tenth of an inch. To give an example of this, the BOIly 10 x 6 is, in fact, a 10.2 x 6.2. The prop was designed to be a 10 x 6 equivalent in rpm (compared to normal nylon props), but has improved airborne performance due to the extra diamater and pitch. To have quoted 10.2 x 6.2 would only have confused the issue.

As we all know, the only true test is to determine the airborne performance, but that is clearly not possible for a magazine to do. Any test is better than no test, and they give us something to talk about.

Yours faithfully,
Les Bollenhagen



When Bob Meyer gets a round to it he produces some amazing models. This saucer will roll 360° in its own length, .. er, diameter. Inside and outside loops are tiny. It is covered with plastic laminate film used to seal documents. Electric powered, of course. The AIRBORNE camera at the Veterans Gathering 1990.

Dear Sir

Congratulations to you and the Manager and staff of Australia's longest-running modelling magazine.

Australasian AeroModelling survived only 2 issues; The Australian Modeller ran for 9 issues; Australian Models and Hobbies just 10 issues; the Australian Model Engineer produced 37 issues; Australian Model News continued for 43 issues. *Hobbies Illustrated scored a few more issues during ten years, and Australian Radio Control Modeller produced about the same number over a similar period of time.*

AIRBORNE reaches a milestone with this, its 100th issue.

On behalf of all Australian modellers, — Well done!

Yours faithfully,
Ivor F. VH1

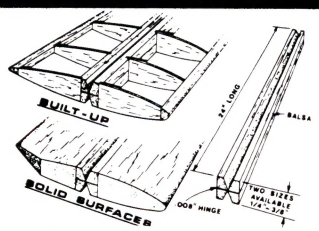
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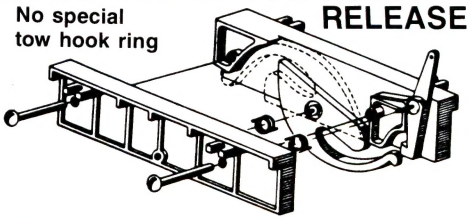
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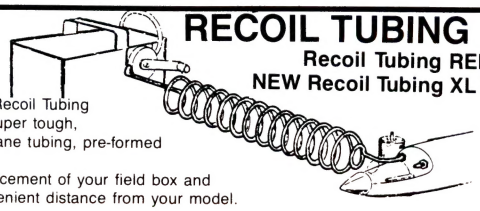
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RECOIL TUBING

Recoil Tubing RED and NEW Recoil Tubing XL BLUE



The Fourmost Recoil Tubing is a length of super tough, fuel-proof urethane tubing, pre-formed into a coil.
It allows the placement of your field box and fuel can a convenient distance from your model.

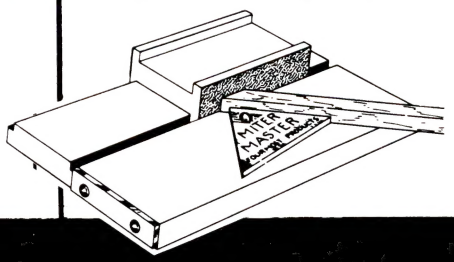
After use the tubing will retract into its earlier space-saving form, out of the dirt and out of the way.

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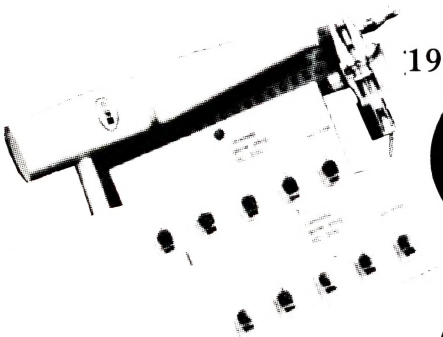
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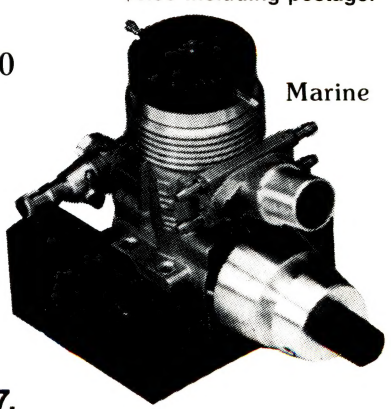
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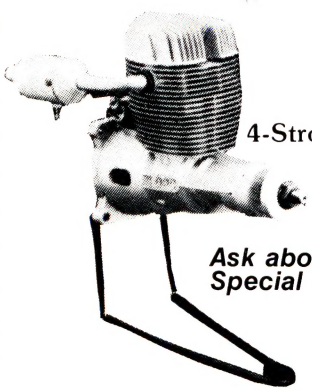
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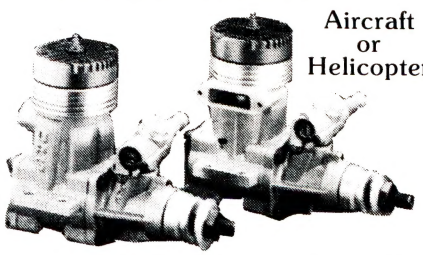
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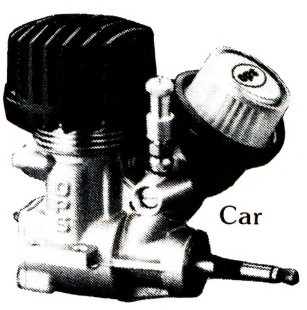
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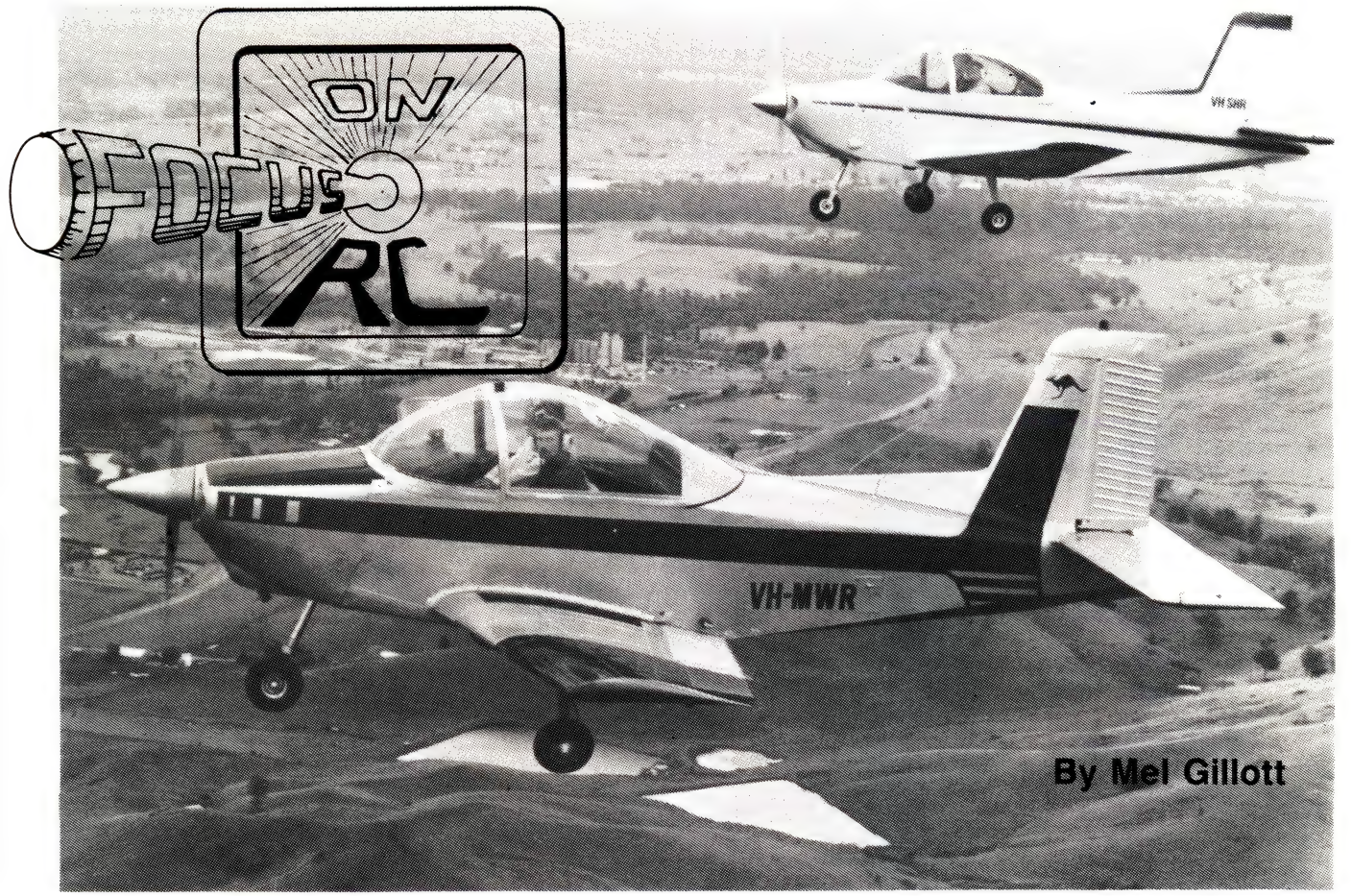
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Car



Peter Bons flys radio control aircraft. His favourite is the new Airtourer. Not this one which has 150 HP! The radio control in this case comes through Peter's earphones, and the signals are decoded and channelled by a Mk 1 human being! Is that other Airtourer a model? Perhaps it's Col Taylor! Photo taken near Camden.

TON UP!

One century is big numbers in any game, and AIRBORNE makes it with this issue. No Bruce; not one hundred years, but a hundred issues. You didn't see it on the front cover? Yes, I know it's difficult to get past the other adornments on the colour page, but check again and see that we made three figures. Let me assure you, this is quite an achievement for Australian modelling. If you can locate issues No. 44, April 1981, and 48, December 1981, then check out Airborne's chequered past, as described in articles by the Editor, Ivor F and the late Russ Hammond, especially the early days when continuity wasn't always consistent. Nowadays the sport and the magazine are looking really healthy, thanks to the benevolent Ayatolla Buckmaster at the joystick, and the support of our loyal contributors and readers. We might not be perfect, but we hope you can stay and fly with us during the next hundred.

SUPER MOSFET POWER PANEL
by Thunder Tiger

The latest version of Thunder Tiger's very popular field box power panel has a discrete innovation. In appearance it may look like the Mk 4 and other panels, but the glow driver circuitry is different. It's the first to use a Mosfet (Metal Oxide Semiconductor Field Effect Transistor) driver, which is in keeping with the latest thinking to save energy. More on that later. For those not familiar with this panel, here's what it will do:

* The input connects to a 12 Volt power source such as a small motor cycle battery.
* Banana type sockets are provided for connection of your 6 Volt fuel pump. This outlet is controlled by a push-on/push-off switch and a slide switch to reverse polarity and hence direction of the DC pump motor to empty as well as fill tanks.
* Similar sockets for a 12 Volt outlet. This is non-switchable or reversivble, and may be used for starter motor or pump. If you want to use both, it might be a good idea to make up a Y lead.
* A third set of sockets for connecting your glow plug leads. Three pairs of banana plugs and a pair of alligator clibs are furnished.
* A large knob controls the current (Amperes) going to the glow plug.
* A large meter reads the current (Amperes) going to the glow plug.

Metal Oxide What?

The heart of this panel, and the bit that you pay the money for, is the glow plug driver. I looked into this a little more carefully. Power is applied to the plug in rapid pulses which are controlled by an IC and the Mosfet which the user affects via the adjust knob. The whole gubbins is short circuit protected and also protected against connecting the input reverse polarity. You'll have to try a bit harder if you want to fry it! The practical advantage of this electronic wizardry is that it consumes only about ¼ the amount of electricity, and that computes to less chance of a flat battery and hence no glow at a crucial moment. This becomes obvious as soon as one connects a plug. We tested with many different plugs, and for optimum brightness the meter varied between about 0.6 and 0.9 Amps. The get the equivalent brightness with a traditional power panel or directly connected 1.2 Volt cell (nicad or Gates cell) the current draw was at least 2 Amps. With the knob on the Mosfet power panel turned to max, a plug glowed white hot but the meter reading was only about 2 Amps. Good for drying out flooded engines and destroying plugs if left on for too long. Always the sceptic. I checked the accuracy of the panel's meter with a digital multimeter. It was right on the button. I also checked the panel's input and found it to be about 0.1 Amp higher than the glow driver output. This slight inefficiancy is due to the power used to drive the internal circuitry. It also accounts for the slight heating of the case (the Mosfet is bolted behind) when the device is working hard.

Power To The People

The Thunder Tiger Super Mosfet Power Panel is attractive enough to grace any field box. It should also be reliable. The earlier models of this product gained much local press due to its teething problems, which were all sorted out by the Mk 4 version. Now, this reputable Taiwanese manufacturer has the confidence to introduce more modern technology and bring the humble power panel in step with the nineties. Well worth considering if you are after an upmarket panel at a competitive price.

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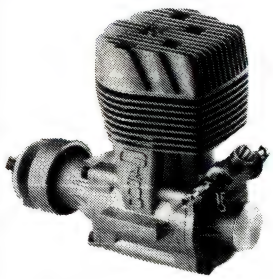
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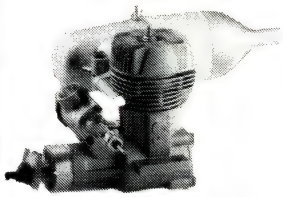
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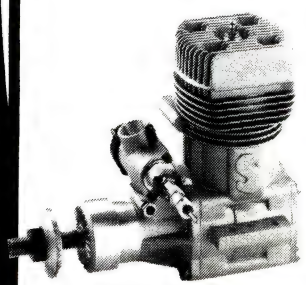
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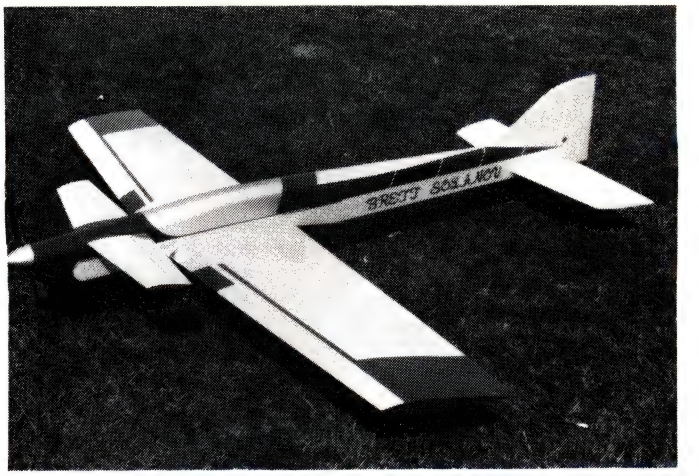
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S2000/25 FI RC
S3000 FI RC
S6000 In Line 60cc Twin
S29H ABC/R & Muffler
S45H ABC/R & Muffler
S61 ABC/R FI RC & Muffler
S90 ABC/R FI RC & Muffler
S21/25/29 TIGER'S PAW Muffler
S40/45/51 TIGER'S PAW Muffler
S61/75 TIGER'S PAW Muffler
S90 Tigers Paw Muffler
S61/75 Tuned Pipe

All above engines supplied with glow plug



Faceplate of the new Thunder Tiger power panel. Note the Mosfet appellation. It really is a better system.



A brave new pattern design by Brett Solanov. Brett was not unsure where to put the tailplane. The aircraft flys well and is quite competitive. It is called Sutolego. Photographer Gillott says "You work it out!"

CHEAP NICAD CHECKER

Experience tells us that the rechargeable nicad battery is the weakest link in the control of RC aircraft. Actually, the nicads themselves are pretty reliable, but they do require human intervention, in the form of charging and discharging, to keep them operable, and, as we all know, the human factor is the least reliable of all.

This weak link has been a blessing to the marketing experts and manufacturers, who now inundate the poor modeller with a miriad of high tech gadgets to feed and care for our little nicads. Over the years all the gadgets we have tested worked fine, and they certainly have their place but, to reverse the trend, it was good to see the simple circuit presented on page 15 of Airborne No. 96. Under the unassuming name of **Receiver Battery Tester,** the set-up submitted by Geoff Hennig is all you need to check nicads, and maybe save a model. All that is required is a digital voltmeter (nowadays almost compulsory for a modeller and handy-person's tool kit) and a fifty cent resistor. Take another look at No. 96 before I proceed.

David Jacobs from Launceston in Tassie wrote with a query regarding Hennig's tester. Although the article referred to the normal 500 mAh on-board battery pack, David wanted to know if it would be a viable proposition to check the 250 mAh pack he uses in his two channel sailplane. The answer is simple - Yes. But what about even smaller cells, like 150 mAh, or bigger packs like 800 or 1200 mAh? How about a five cell pack?

At this point a little education would not go astray. What we are trying to achieve is the testing of the pack under load conditions, preferably with a load similar to, or exceeding, that found in normal use. One could simply place a voltmeter probe across the wires coming from a battery pack, but that would tell us very little because the meter alone does not provide a load. Nicads almost always show their nominal voltage under no-load conditions. Even a dead flat pack that has been standing for more than a day will self recover to show some voltage. (This should not be confused with charged nicads that routinely self-discharge about 2% a week when stored.) Since we are using the voltmeter reading to assess the state of charge, then a reading taken without load can be dangerously wrong.

We therefore have to apply a load in the form of a resistor, but how do we find the value of the resistor? Easy, with some simple Year Seven maths. Good old Ohm's Law says that R = E/I; or resistance is volts divided by current in Amps. Let's check the original Receiver Battery Tester first. Transposing the formula gives I = E/R. Our four cell receiver pack is nominally rated at 4.8 volts, and the Tester's diagram showed a resistor value of 10 Ohms. Therefore E/R equals 4.8/10, which is .48 Amps, or nearly half an Amp., which happens to be the same figure as the nominal capacity of the 500 mAh pack (there are 1000 mA in 1 Amp). A large power aircraft with six or more servos could quite easily draw half an Amp, giving one hour's operation with a typical 500 mAh pack, so the 10 Ohm resistor shown is about right.

It's not likely that Mr Jacobs' 250 mAh sailplane pack would be asked to deliver as much as half an Amp, but the 10 Ohm resistor could still be used. It would drag the voltmeter reading down a little more than necessary, but better to be safe than sorry. Just don't leave it connected for too long, since the little cells do not like the big load. A more typical load might be one fifth of an Amp (200 mA), so, transposing Ohms Law yet again we get R = E/I, which means you should enter 4.8 divided by 0.2 in your calculator. The answer will give a new resistor value of 24 Ohms. Incidentally, the resistor should be of the white ceramic type rated at five watts or more. You cannot just use the small printed circuit type of resistor (one watt rating max) since they will burn out with the high loads. (If you want more maths, then Watts = Volts x Amps, or in our example, 4.8 x 0.48, which gives 2.3 Watts.)

It's the same story with other sizes of nicad packs. Just use the formula R = E/I after guessing what the load might be. The best way to guess the load is from experience with that pack. For example, if your 1200 mAh pack in a helicopter is usually good for 6 by ten minute flights, then the average load is 1.2 Amps (1.2 Amps per hour divided by 1 hour), and the discharge resistor should be 4.8 ÷ 1.2, which equals 4 Ohms. If using more than four cells in series, just allow 1.2 volts per cell, therefore for five cells you would use 6 volts instead of 4.8 volts in the calculation. A pattern flyer might use a 12 Ohm resistor, calculated by dividing 6 volts by 0.5 Amps.

For a few dollars more, our cheap nicad checker could be made to look like a bought one. Put one or more resistors in a Zippy box (check out Dick Smith Electronics), equip the box with socket outlets marked according to the type of model being tested, and make up a fly-lead to fit into your airborne pack's charge socket. You could even install a meter instead of having to connect your multimeter every time. Having done that, our reader now has a gadget equivalent to most other nicad testers on the market, and your columnist has ensured that nobody in the trade will ever send him their tester for review again!

Always check your batteries at the field before a flying session, and preferably before every flight. The best tester in the world won't save your model if you don't use it; that's the weakness of the human factor.

SCALE MODEL AIRPLANES;

by David Boddington. Published by Argus Books, Hertfordshire, England.

Still they keep coming! There are now fifteen Radio Control Handbooks in this series. Many of them have been reviewed in Airborne. Like the others, this one has an attractive soft cover, inside which are 64 pages of easy-to-read text accompanied by black and white pictures and diagrams. Each handbook covers a specific aspect of our sport and hobby. As the name suggests, Scale Model Airplanes (despite its UK origins, it must be aimed at the American market since the Poms call them aeroplanes) takes the reader from selecting a model, through designing, building, equipping and finishing, and up to flying. There is a good discussion on trying to emulate a scale engine sound, and some useful covering and finishing tips for many of the covering materials, otherwise Boddington does not get too specific, but rather relies on expounding the various avenues available to the scale RC aircraft builder. The discussion is more chatty than detailed and, as in his other books written during a working vacation in Ibiza, relies on Boddington's vast experience rather than sound research.

It occurred to me that to gather together all the accumulated knowledge in our little pastime would take up at least a dozen volume encyclopaedia, so vast and multi-faceted is our hobby. Collecting these handbooks is perhaps as close as anyone will get to that encyclopaedia, in which case they are a worthy addition to your library. The expert may not learn a great deal, but for those embarking on their first scale project this handbook should be highly educational. MG

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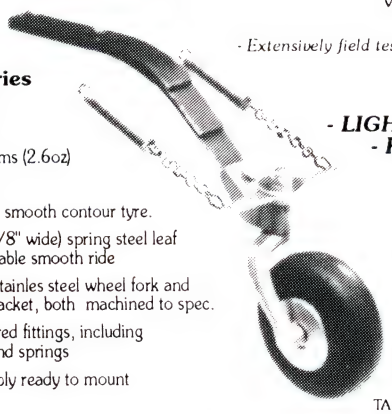
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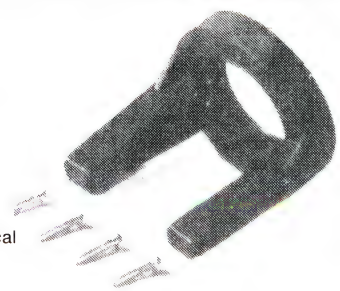
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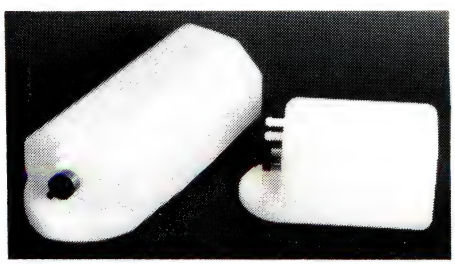
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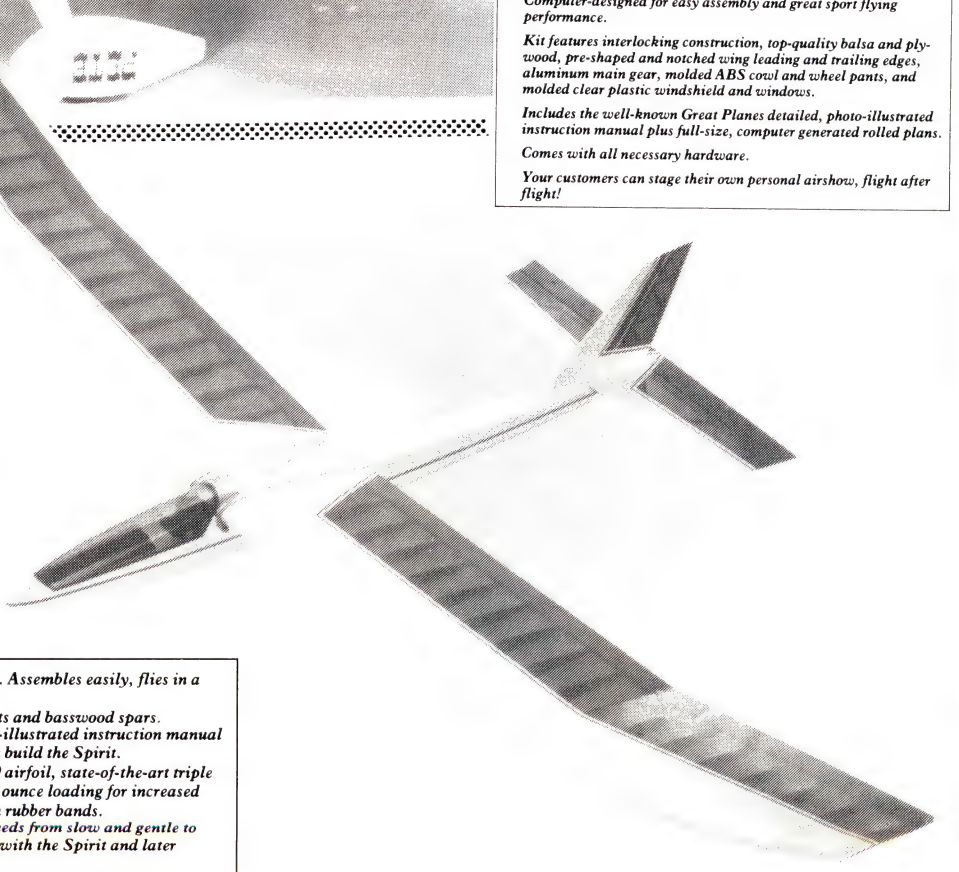


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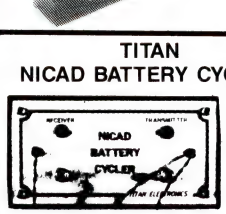
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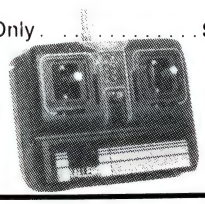
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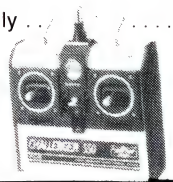
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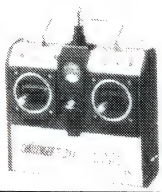


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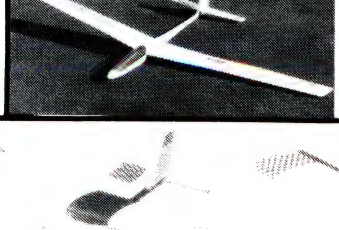
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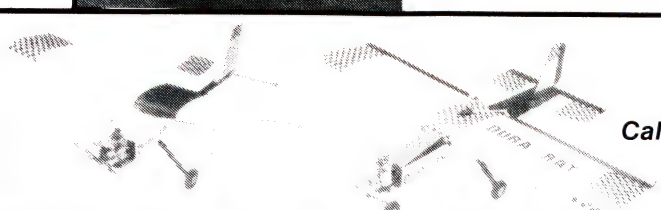
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Mr. Eddie Lo, sponsor of the Kraft Masters, presents the second-place trophy to Chip Hyde from the USA. A good photo on a dull afternoon, from Chas Banhelyi.



With Eddie Lo's sponsorship, these gentlmen made the Kraft Masters another success. Brian Green, APA President; Charles Banhelyi, Co-ordinator; Tom Bloodworth, APA Treasurer; and Henry Hutchinson, Contest Director. Charles, who took this pic?

KRAFT MASTERS 1990

Results

1.	Quique Somenzini	1000.00
2.	Chip Hyde	991.79
3.	Eddie Edwards	943.52
4.	Peter Goldsmith	942.44
5.	Steve Coram	918.00
6.	Dave McFarlane	901.14
7.	Min	890.69
8.	Baojing	861.16
9.	Jason Bruce	842.95
10.	Aiqiang	831.46

Congratulations and thanks to Eddie Lo for his sponsorship by Kraft Systems, and to Chas Banhelyi and the APA for another very successful contest.



The Australian team wins the Asian Pacific Championships. Eddie Edwards, Peter Goldsmith, Brian McFarlane (manager) and Steve Coram. The brown-eyed handsome man in the middle is G.A. (Peter) Lloyd AO, OBE, honorary Governor of the Australian Sport Aviation Confederation. A very distinguished group.



The Chinese team at the Kraft Masters, with Andrw Banhelyi, youngest Master pilot at 15 (centre), and Bill Bloodworth, the youngest competitor, at 12, kneeling. Banhelyi photo.

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Red Dragon

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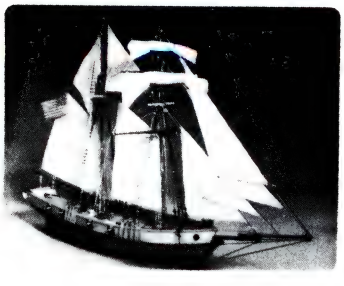
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20400 LE HUSSARD French Navy Brig/Schooner LOA 720 mm, height 550 mm, beam 130 mm
20401 SCOTTISH MAID, LOA 690 mm, height 460 mm, beam 100 mm
20404 HANNAH US Continental Navy 1775 LOA 760 mm
20500 BLUE NOSE II with sails, LOA 710 mm, beam 110 mm, height 590 mm
20502 HARVEY two-masted schooner with sails, LOA 920 mm, beam 170 mm, width OA 320 mm, height 670 mm, NEW Version (completely redrawn)
20405 CLARAMAY English Trading Ketch 1891-1953
20504 KING OF THE MISSISSIPPI Paddle Steamer, LOA 660 mm, height 280 mm, beam 130 mm
20600 HMS ENDEAVOUR with sails, LOA 790 mm, height 620 mm, width OA 160 mm
20601 CHARLES W. MORGAN, LOA 780 mm, beam 129 mm, height 670 mm
20700 USF CONSTELLATION, LOA 1035 mm, height 710 mm
20710 J.S. ELCANO Naval Academy Training Ship, Length 1020 mm, height 540 mm
31000 14th Century Clock
20720 SAN JUAN NEPOMUCENO (74 cannons) LOA 950 mm

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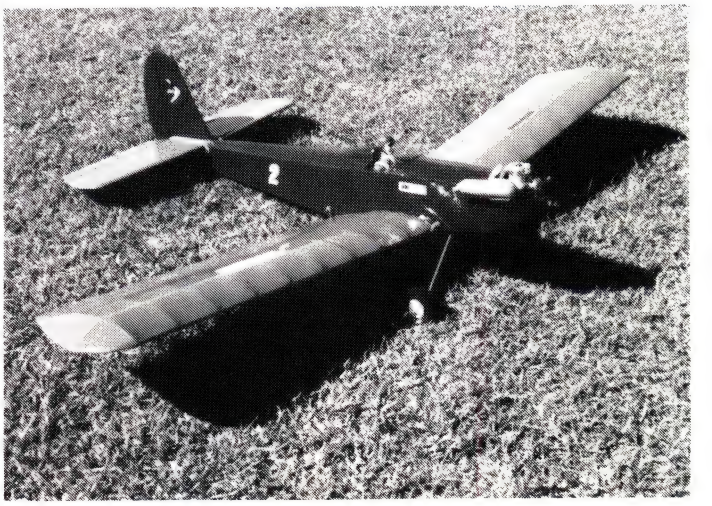
ADAMAS 1 & 2

A Beginners and a Sports Model

by Don Howie



Adamas One, high wing version, with Enya 11CX. Taipan 7 x 4 propeller. Lightweight foam wheels. Wing and tail held on with rubber bands.



Adamas Two, low wing version, with OS 15 FP and 8 x 4 Taipan propeller. Note mute section added to muffler. Wing and tail covered with orange Econocote, fuselage and fin finished with blue enamel.

Introduction

Like Adam, this model is a first. It can be a beginner's first model (Adamas 1) with a 1.5 cc engine, and later on a great sports or fun model (Adamas 2) with a 2.5 cc motor. It is equivalent to two kit models in terms of construction time, but the saving over two kits is estimated to be at least $100. Remember, you have only one set of wings, and one undercarriage, tail and fin to built and cover.

The development started about 35 years ago. I had designed a successful free flight scramble model which used a profile fuselage from 3/8 inch sheet balsa and had a side mounted Mills .75. This model had standard (2 spar) built-up wings and tailplane (fin glued to tailplane).

I think that at the time I was impressed with the Aeromodeller designs of the late P.E. Norman who flew low wing scale models, and also his later ducted fan models. This inspired me to build a low wing free flight model using the wings, tail and fin from one of my scramble models. At least, if it did not fly, I had only built a fuselage. The model was slightly semi-scale, like Adamas 2, but had a part cowled, inverted inverted Mills .75 for power. I think it had a pendulum rudder, which was soon discarded when I could not get it to work. Eventually I got it to fly left hand circles, and I remember tha Max Starick was quite impressed with the design after seeing it fly.

The wing construction of Adamas is simple, the dowel leading edge has been proven on two previous models. One was flown by Gordon Burford to test his then new 2.5 cc ballrace Glo motor (rear exhaust) as a sports motor rather than just in ¼ Midgets. Gordon said he had hit a fence post without damage to the wing. The other feature of the wing and tail construction is that it is stressed to take the load evenly. As an example, the tailplane tapers towards the tips that do not take the same load as the root. The wing uses thinner (and lighter) re-inforcement between the spars as you go further out to the tips.

Two types of constructiion are shown for the fin and rudder. Solid sheet can be used for the rudder and elevators to save time or if using a heavy motor such as the OS 20 4-stroke. The open structure (Adamas 2) has a vintage look when covered with transparent film, coloured nylon or silk. I was tempted to use transparent or see-through covering on the wings and tail, but thought it might not appeal to beginners who seem to prefer semi-scale type modern aircraft.

The fuselage of Adamas 1 has been designed to be as simple as possible. This enables the beginner to get flying as soon nas possible. The fuselage of Adamas 2 is more time-consuming; not complex but rather like a vintage model, so take it slowly. A low wing, such as this, is not difficult to fly, but the beginner should stick with the high wing model in the learning stages.

Both models have been designed as 3 channel aircraft. I was tempted to build the high wing version as a 2 channel, but it is possible to get a 2 channel radio converted to 3 channels to give high and low throttle. This has been advertised in previous issues of Airborne.

CONSTRUCTION

I will describe the easy bits and ways to save money on construction first.

Wing.

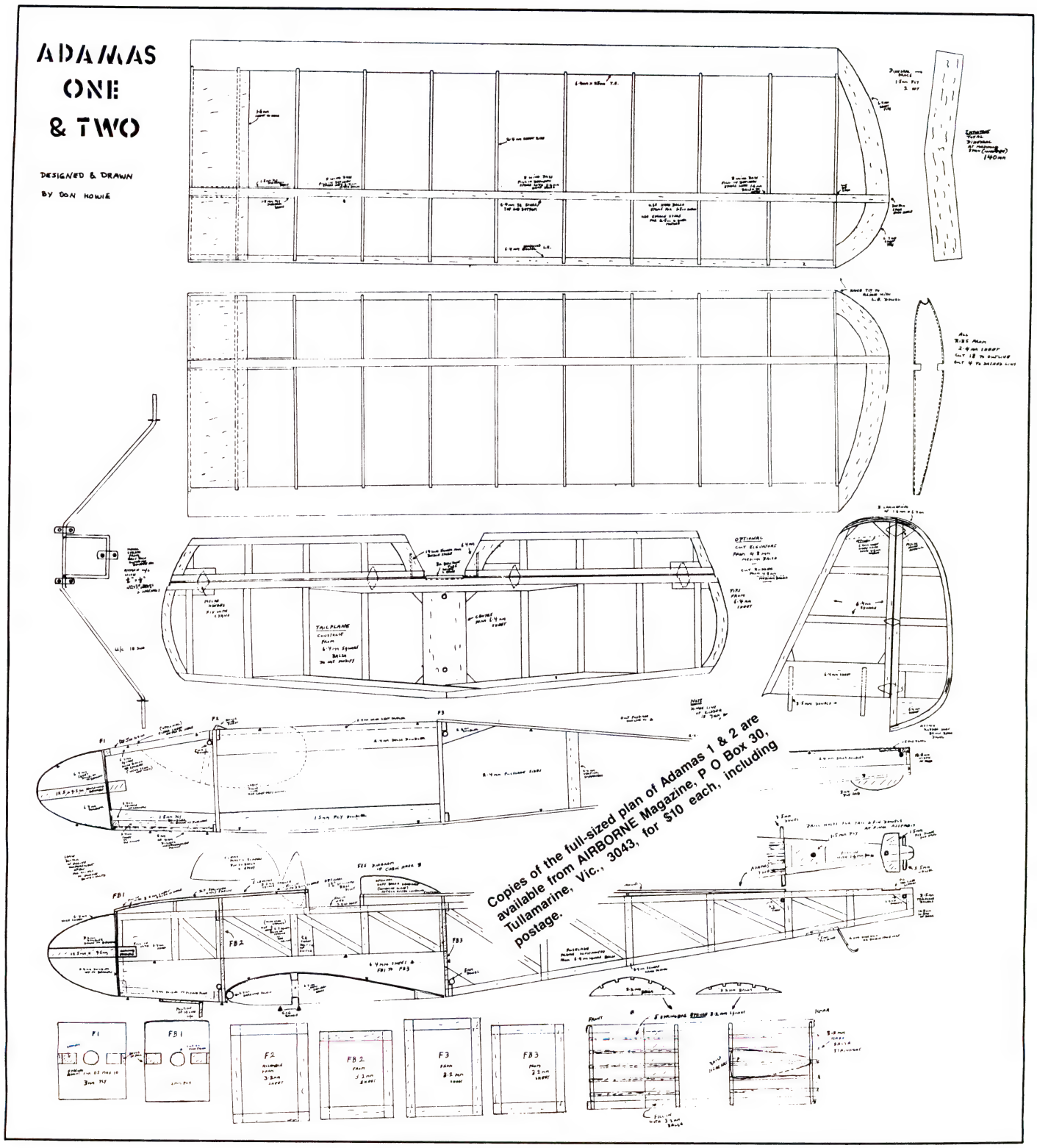
Go along to your local hardware store and obtain 2 lengths of hardwood dowel. The sizes are 6.4 mm (¼ inch) and 5 mm (3/16 inch). It would also be worth getting 6 nuts, bolts and washers ⅛ x ½ inch for the undercarriage mounting at the same time. Check that the 6.4 mm dowel is straight and not bowed. The trailing edge 25 mm x 6.4 mm is obtainable in 1200 mm lengths (at ABC Models), so you need only one length. Use hard 6.4 mm balsa for the spars. Remember to keep the bits that are left over, as you will use them in the fuselage of Adamas 2. If you are an experienced modeller, building only Adamas 2 and using 2.5 cc or over for power, then use spruce spars in the wing. The model was designed to be light, with a maximum power of 2.5 cc. I have Adamas 3, an electric model, in the pipeline, so I need to keep it strong and light. It is also a low volume model, like an Old Timer, which relates to low cost.

Cut one rib accurately from 2.4 mm balsa, then draw the other 21 ribs on the same sheet of balsa. Cut out another rib accurately and the others roughy, over-size. Finish the ribs off by the sandwich method, and finally wrap a piece of sandpaper around a piece of 5 mm dowel used for the leading edge. Pin down the 6.4 mm bottom spar; it goes right to maximum span. Notch the trailing edge with a flat file of the correct thickness. Add the top spar, which is cut at the last rib. The leading edge dowel should slot in easily. The tips are cut from 6.4 mm sheet in 2 pieces: the rear is flat on the building board and the front part rises to align with the LE dowel.

Fill in the first 2 bays of the wing (between the spars) with hard 6.4 mm balsa, then add the two 1.5 mm dihedral braces, allowing a gap of 1.6 mm top and bottom to support the wing centre sheeting. Next fill in the next bay with hard 6.4 mm balsa (between the spars). The next three bays are filled with 3.2 mm hard balsa, then the next three bays with 1.6 mm balsa. The amount of dihedral is very important, and is based on designing many low wing models without ailerons. Total dihedral is 140 mm, measured at maximum span. Add centre sheeting, top and bottom. The only finishing is slight sanding of the wing tips. Balance the wing by adding a small piece of lead between the spars at the wing tip.

Tail

This is built from 6.4 mm square balsa, and should not be modified. The elevators can be cut from medium 4.8 mm balsa if you wish to save building time. Cut a piece of Bic ballpoint tubing to length; score the tubing with knife or file, recess slightly in the tailplane TE and add epoxy to hold it in place. The elevator joiners are bent from bicycle spoke wire.

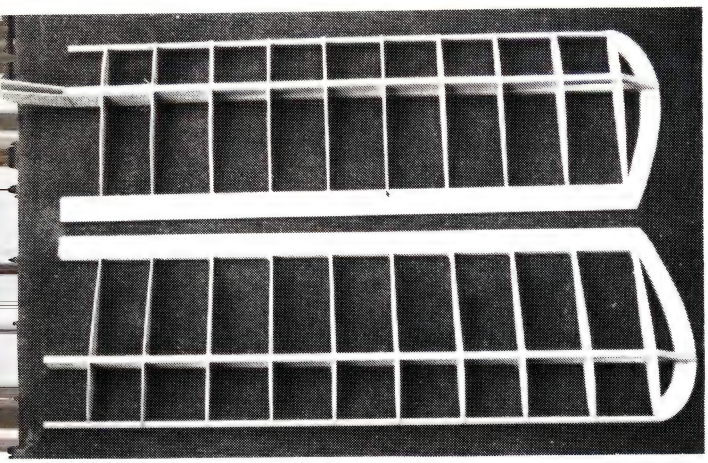


The fin is also built from 6.4 mm square balsa. The rudder can be cut from medium 4.8 mm balsa, but the laminated version is light and very strong. I cut the former (or outline) from a cardboard carton (see local supermarket) and pack this up off the building board with some scrap 1.6 mm balsa. Cut three strips of 1.6 x 6.4 mm balsa, and add white glue. The inner and outer sheets should be dampened with water and it will bend esaily around the cardboard former. Hold in place with pins and leave overnight to dry. Remember that the hinge of the rudder is 7 mm behind the hinge of the elevators, so take care when drilling the two holes in the tailplane for the fin dowels.

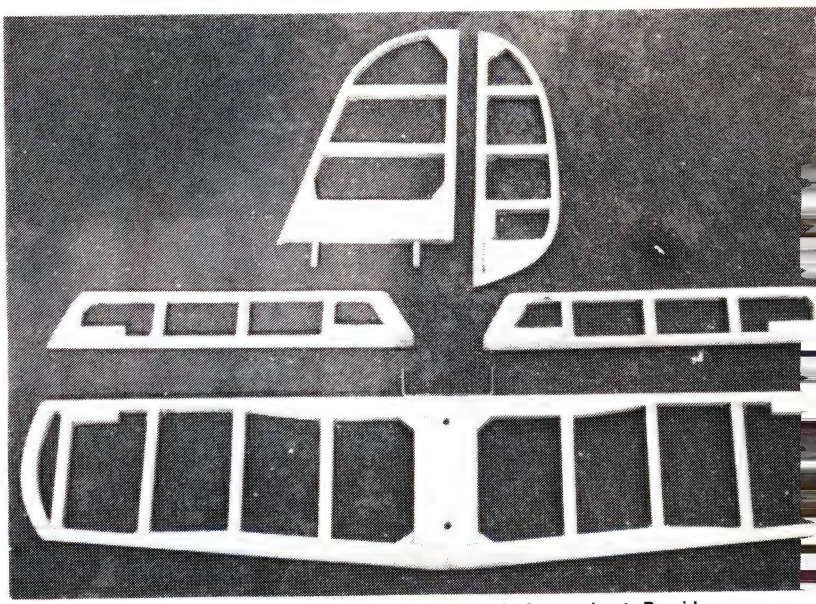
Fuselage

Adamas 1. This is very fast and simple to build. Trace the outline of the fuselage onto balsa using carbon paper. Assemble F2 and F3, and let dry. Join the sides together with these two formers before adding all the inside fuselage doublers. I used a radial mount for the Enya 11CX; it came out of a Viper ½A pylon model. F1 has built-in downthrust; use two laminations of 3 mm for F1 if using a radial mount. The clear windscreen is great for checking the fuel level and for getting at the undercarriage nuts and bolts.

Adamas 2. It looks complex but is quite simple, needing very little sanding and shaping when finished. Build up the fuselage side from 6.4 mm square medium balsa after laying down the 6.4 mm balsa wing seat that extends to the



Wing structures feature hardwood dowel leading edge and the only shaping after assembly is on the tips. Spars are webbed. They should be hardwood for 2.5 cc motors.



Tail components of Adamas One or Two. Material is 6 mm sheet. Provides sufficient strength without the weight of solid sheet. Some laminated outlines are even stronger for this weight.

position of FB1. Forward of FB3 use hard balsa for the upright and cross pieces. After building two sides, join the fuselage with FB2 and FB3. Add all the 6.4 mm square cross pieces, top and bottom, and F1. Add the undercarriage plywood plate and the re-inforcements for this plate. Next add all the fuselage top formers. The only former that is slotted is at the front headrest position, which give the position of the 3.2 mm hard balsa stringers that go back to the tailplane. Use 3.2 mm square spruce stringers (1 length is sufficient for 5 pieces) to FB1.

The engine bearers need balsa spacing to fit an OS 15 FP motor. Extend the bearers into the tank compartment for strength. Add the wing and tailplane dowels, which should be strongly glued and re-inforced. If you intend to build only one version, or do not mind hacking up your original version, then omit the tailplane dowels and glue the tail to the fuselage when in is covered.

COVERING AND FINISHING

If using an iron-on covering for the wings and tail, I suggest that you first give these surfaces a coat of Balsarite. It is expensive, but can be thinned with dope thinners, and stops the covering from lifting during hot weather. I used orange Econokote, but vintage yellow Solartex would also look good.

On the fuselage, fin and rudder of Adamas 2 I used Skyloft spun nylon covering. This is one material for which it is best **not** to follow the instructions. Caution: do not use any water on this nylon covering. Dope the fuselage first and then apply the covering using dope. A couple of coats of dope will usually fill the pores of the nylon completely and make it ready for an enamel paint finish. I have found that a dark blue fuselage and fin goes well with orange wings and tail. A red or dark green fuselage looks good with yellow wings. Small models need good visibility, so I use these colours.

The finish on the fuselage of **Adamas 1** was the old dope and talcum powder method. It takes about three coats of dope, talcum and a couple of drops of castor oil, to get a smooth finish on the balsa wood. Allow time for the dope to dry before sanding smooth.

FLYING

Attach the undercarriage to the fuselage with 3 straps made from scrap galavanised metal. I use galvanised roof guttering and attach it to the fuselage with nuts, bolts and washers. **Do not use wood screws.** Use lightweight sponge wheels.

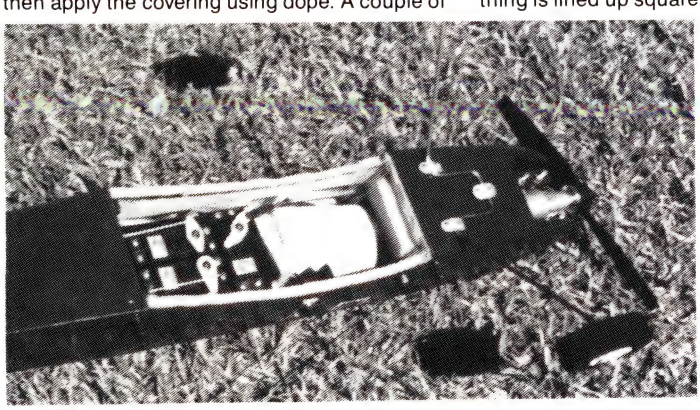
Adamas 1 has plenty of room for any size radio gear, so servos can be shifted to get the CG right on the main spar. Epoxy the fin to the tail, and drill the two holes accurately at the tail end of the fuselage to make sure that the tail does not move during flight.

I use 6 small, thin rubber bands on each side to hold the tailplane on. Make sure that everything is lined up squarely. Elevators need about 5 mm up and 5 mm down for a start. This will make the model easy to fly. Adamas 2 needs twice the rudder movement to get the same degree of control as Adamas 1, so get all the movement you can for No. 2, then reduce this by half and you will be right for No. 1.

The models came out to a bit over one kilogram, or about 2½ pounds. This gives a low wing loading, which allows a 1.5 cc engine to pull it easily off the ground. It is difficult to stall the model with the stated elevator movement, and the model will hover in a 12 knot wind.

To take off, hold full up elevator and make sure that the model is pointed directly into the wind. Full power and you will be in the air after a couple of metres take-off run with a 2.5 cc engine. The OS 15 FP is a fantastic basic motor. It throttles very well and the mute muffler is very quiet. Even with an 8 x 4 inch prop it makes less noise than a Graupner geared electric motor. The Enya 11CX is another fantastic small motor. It has all the features of the larger CX motors, such as AAC, twin ball races and tapered groove fuel metering carburettor.

If you build your model lightly with good glue joints, you will be rewarded with a great flying model that should have a long life. I know of no other basic aircraft that has all the features that this model has.



Radio access and undercarriage of Adamas Two. Very easy, as for engine bolts. Rx battery sits on top of Rx. Wing seats on strips of plastic foam glued on with balsa cement.

DOONSIDE AEROMODELLERS' CLUB

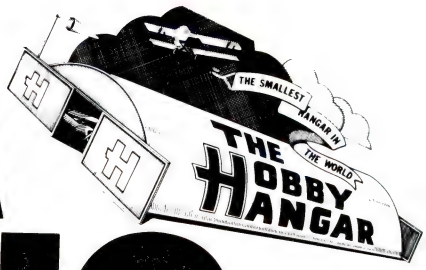
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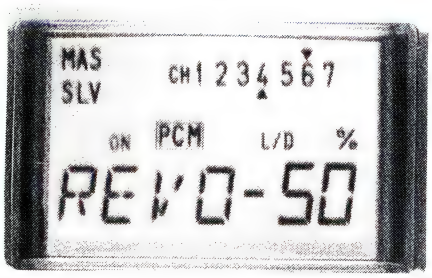
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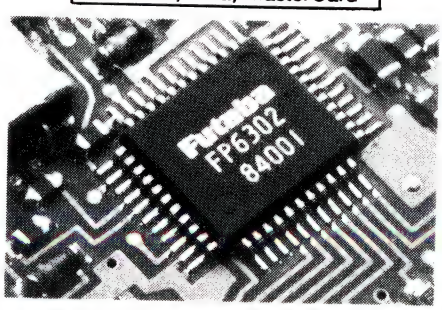
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SAFETY SERIES

by Len Williamson

EMERSON FITTIPALDI SAYS IT'S O.K.

BUT IS IT?

The holder of the world title in the Formula Indy Class of racing cars uses methanol for fuel. He is reported as saying (New Scientist, 10th Feb. 1990) that his mechanics and other support staff have experienced no health problems, and methanol is OK by him. This opinion is not, however, shared by environmentalists and trade unionists in Brazil.

The New Scientist says that Brazil cannot afford to import enough petroleum to fuel privately owned vehicles, and for the last few years they have been producing ethanol by the fermentation of indigenous flora. Demand is now beginning to outstrip production, and it is proposed to use methanol (made by a catalytic method) to diliute the ethanol-petrol mixture.

It is known that long-term exposure to high levels of methanol can cause vomitting, headaches, blindness, brain damage and death, and it is thought that petrol pump attendants and service station employees could be affected if the go-ahead is given to the methanolisation of their gasoline.

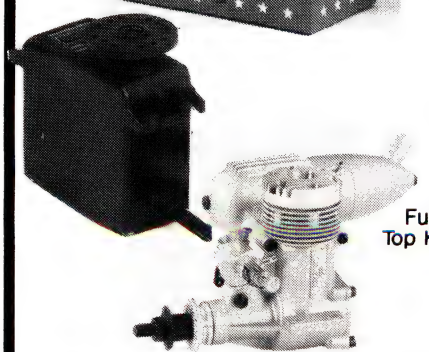
A table was published in Airborne No. 94 giving the toxicity of methanol vapour based on information provided by Worksafe Australia. Continue to handle it with care. If there is any change in the safety limits we will advise you. Sadly we report that our advise in Airborne No. 93, not to ginger up your orange juice with methanol was not known to a group of young people ... not aeromodellers, as far as we know. One of them who did exactly that died soon after admission to hospital. Please keep your eyes open to what's going on around you and SPEAK UP!



The well-known Corby Starlet, a greatly respected design, this one by Alan Martin is slightly over ⅓ scale, giving a wing span of 2.08 metres. Weight is 7.25 kg for the Saito 270 and 20 x 8 propeller. Covering is doped nylon with Dulux sprayed finish. Photographer Gerard Power comments that Alan has a new model each year at Shepparton.

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The Airborne ENGIN-EAR

by Brian Winch

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A SHORT RESPITE

Since I have really stretched the friendship this month with a super-large engine report of a super large engine, I will snip the tail off this section by way of appeasement to the chief pilot in the front cabin. Also, I will tell you a little story about one of his engines. As well as all this good stuff, on account of it being the century issue I have included a super, money-saving, you-beaut idea from the Winch Workshop. Here we go:

WEAR? WHERE?

Two sailors scrubbing the deck. One said "Where's the soap?" The other said "Sure does." The editor said "Why's it worn?" I said; "Stiffen the crows! What's this?" when I opened a small parcel and viewed an odd shaped, oily black mass. Holding it gingerly with a set of long handled tongs, I was able to ascertain, when viewed under a strong light, that the 'thing' was - emphasis on 'was' - an engine. Another look in the box revealed a short note requesting "clean, measure, examine and tell why worn out. MB" Well, I carefully dropped the lot in my tank of XXXX strength cleaning fluid, and it fizzled and popped and spat the engine back out onto the floor. I bolted the engine to a 4 kg lead weight and slipped it back into the cleaner. More gurgling and groaning, and the tank sides heaved in and out, but the engine stayed submerged. This stuff is a real worker, and I usually find that 3 hours is quite sufficient to clean a really grotty engine to pristine appearance. Five weeks later I removed the engine, and the first layer of crud was loose. Back into the tank for more protestations from the cleaner, and this time I left it for 8 weeks. It came out reasonably clean, except for a fair amount of carbon burnt on, which I removed with a cold chisel and Kango hammer. A final round or two with the wire wheel, with added strands of barbed wire, and I was able to make out that it was an OS .25 standard (no RC carburettor).

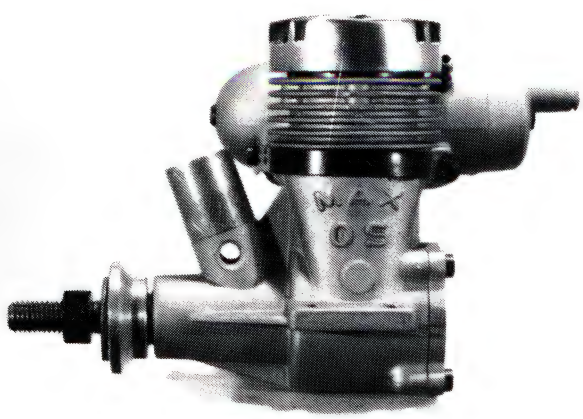
The engine was purchased second-hand in mid 1979 with low mileage on the clock. MB ran/tested it for 10 minutes on 130 ml fuel. It was installed in a Long Cabin old timer in August '80 to October '89. After 22 hours and 20 minutes running (according to the log book) the piston, liner and conrod were replaced, followed by the shaft at 29 hours. The muffler was modified by adding a bottom exit that promptly fell out, so the normal exit was unblocked and used, and a screw was threaded into the side priming hole. (These are all very scientific modifications, mind you.) Again according to the log book, the engine was run for a total of 119 hours (less 28 seconds, to be precise) and has used 73,250 ml of fuel (that's 73¼ litres!) on a 10 x 4 propeller which tached at 10,300 just a short while before the engine was retired. The engine was running at higher rpm most of its life, so the next figure is a low calculation, but it will give you some idea when I say it has done 73,542,000 revolutions (yes, that's 73½ million), and that's 1004 revolutions per millilitre of fuel. The fuel consumption was about 8 ml per minute, and it increased to 15 ml per minute as the engine gained a bit of age.

Actually, it says a lot for a little engine and, knowing Merv, for running on good fuel, being careful with the tuning and a bit of TLC thrown in. The engine is not as badly worn as you might think, as I could measure only .00075 inch ovality, .0005 inch piston wear, .001 inch in the big end and .006 inch rock in the crankshaft, which is rather remarkable considering the life it has had. I really could not advise anyone on how to better this engine history, as I doubt that the figures could be bettered. The wear in the bore is purely wear from metal to metal contact, mostly on starting up. The ovality is a factor of all engines, as the crankpin and conrod angle force the piston against one wall on the up stroke and against the other on the down stroke. The conrod is normal wear with a bit of stretch thrown in. (It hammers away like a miniature jack hammer when there is a little bit of wear.)

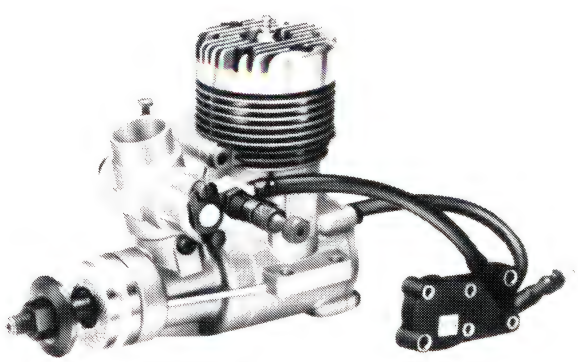
The crankshaft bearing is interesting, as what partly caused the wear in that area is what causes the bearings to die sudden deaths in engines used for competition pattern flying, but I have a hard time convincing some of the flyers. If you hold each side of the axle of a pushbike wheel and have somebody spin the wheel, you will notice that it is difficult to move the axle about from the position you had it in before the wheel started spinning. The force restraining you is a gyroscopic force, and is the same principle used in model helicopters to assist stability. The propeller on the engine works the same way. Ever time you change the attitude (variation of a straight line of flight) of the model, the gyroscopic forces on the crankshaft are tremendous. The greater percentage of manoeuvres of an aircraft are up and down according to the alignment of the engine.

Consider just a turn: you drop a wing and knife edge around then straighten up again. Of course, there is side load on the bearing as well, but rarely as violent as the up and down forces of a pattern envelope. In a plain bearing engine this force, combined with normal wear, causes the bearing to wear more each end, and it ends up like a trumpet outlet each end. This is called bell mouthing. The shaft cannot do this when ballraces are fitted, so it imposes tremendous loads on the bearings, causing heat and premature breakdown. The over-heating is the instrument that causes the almost instant rust that creates a fair bit of wonderment to some flyers. The nitro cocktail that hangs around the bearings is catalysed by the abnormal heat, and the structure of the metal bearings is more open pored, again due to the heat. As they cool down, a fair bit of moisture is absorbed from the air, and Ole Demon rust finds ideal conditions to raise an instant family. He doesn't get the chance to do this with the plain bearing, as he is wiped out of existence every time the engine starts. I have mentioned this before, but have not convinced a lot of modellers; there is a lot to be said for a plain bearing engine.

The other factor of engine wear is the ingress of fine grit which is sucked out of the air. Most of this comes from prolonged running on the ground, where the propeller is constantly kicking up dust and the engine is swallowing it. The obvious answer here is to limit the ground running to an absolute minimum, and fit an air filter to the carby intake. A small engine is not so prone to dust or grit damage, as the tolerances on the fits are so fine that little can get in to cause damage, but don't think that means you don't have to worry. There is enough fine grit



The much-used OS 25, cleaned to as-new appearance by the Engin-ear, after putting up an amazing performance over ten years of hard flying. Thanks Brian. OS is tops with me.



OS Max 46 SF-P-ABC engine really means business with total fuel control throughout throttle range. Fuel tank position is not critical with pump on the engine, so front line of model can be lean and mean and tank could even be on CG.

to go around, and it will chew out any engine if you invite it to the party.

Well, the happy ending is that I was able to restore the engine to some semblance of external beauty, so McMerve can now put it on the mantlepiece in the sitting room for all to see. Just remember, if you happen to drop in for a visit to the Buckmaster domicile, whatever you do, don't mention the nice little engine on the shelf unless you want a rev by rev description of its life, from digging the bauxite for the aluminium to the stage where it was so worn it would turn only props with no pitch on the blades. *Hey! The owner of this power plant was s'posed to remain a nonny mouse. Oh well ....*

THE TIP FOR THE CENTURY

I have about 100 burnt out glow plugs in a small drawer, and I occasionally look at them and wonder if I will ever find a use for them. I have used the odd one as a machining aid at times, and I fit one in a head that I am polishing on the buff to stop thread damage, but that is about all the use I had for them until one day last week. Going through some old gear I came across some glow plugs of many years ago and remembered how I had rewired them. They were take-apart units made by KLG, and the element was secured in a slot in the centre post and the side of the body. I 'found' some wire of the correct gauge in the chemsitry laboratory at college and wound a coil around a pencil lead ('led' as my teacher, Ivor Stowe, would have me spell it). I opened the slot in the centre terminal with a sharp blade, inserted the coil and re-crimped the slot. The plug was re-assembled and the other end of the coil was crimped in the body at the end of the thread.

As all this flashed through my memory I knew that I had the answer for the load of plugs - minus elements - in the drawer. These days the element is spot welded to the centre post and the body, but that presented no problem. I machined up a little jig to hold the plugs, that would provide the earth contact to the centre terminal and the body, and put an electrical tag on it for connection purposes. I then selected a thin copper rod and machined one end to fit inside the coil of the plug. You can use a suitable piece of copper wire held in a pin vice. Now all I needed was power. Have you ever inadvertantly shorted out a fully charged 12 Volt battery? Notice the sparks and the erosion of the metal that made contact? Here is our power plant.

One end of the battery is connected to the holding jig and the other end goes through a switch to the copper electrode. The coil is placed in position with one tail on the centre post and pinned there by our copper rod. Holding the rod firmly in position with a pair of pliers or similar holding device (it gets hot), switch the power on and off. You should see a splattering spark from the coil contact. Repeat this operation for the other end of the coil on the base of the plug body. With a little care and patience you will be able to rebuild all your own used plugs.

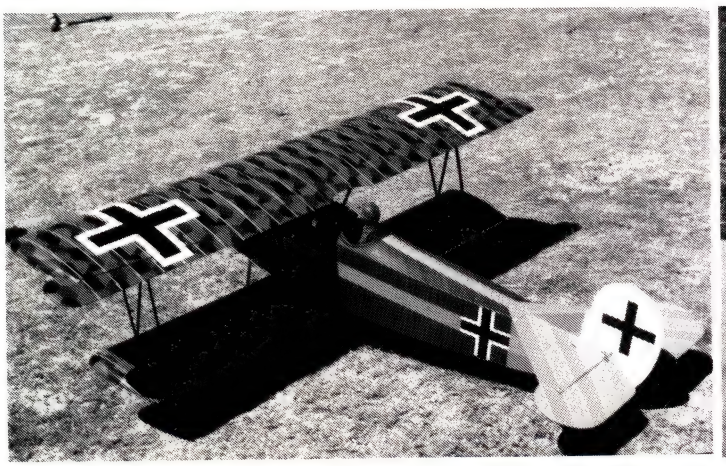
Supplies of platinum wire can be obtained by carefully removing the coils from new plugs.

Well now, what do you think of that for an idea? Should have thought of it earlier and we could have put it in the April edition!

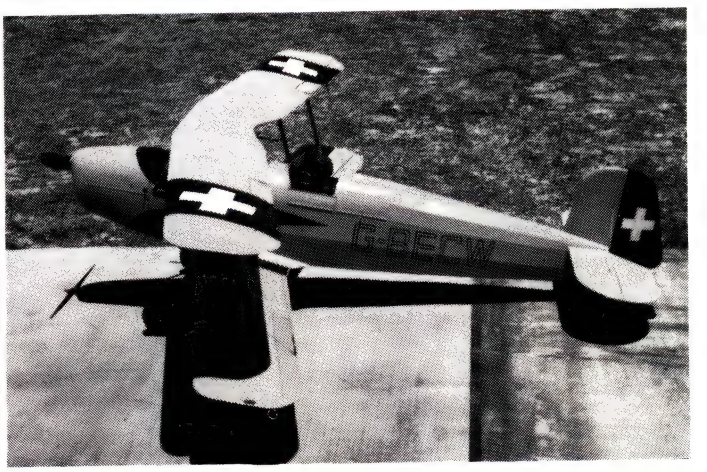
LANDING APPROACH

That's my lot for now, so slip across and read the beaut engine report, while I slip off to tech to continue my course on orology. My teacher assures me I will get to great heights during my studies.

Rippa Korsetorf



Fokker D7 with hand painted lozenge camouflage! By Victor Longbon. Scratch-built from his own plans with tradtional structure. Has OS 120 FS. Pattern was marked on material in pencil, painted after covering. Photographer Schubach was impressed.



Joe di Giorgio's Bucker Jungmann of 1935. Scale is 35%. A Pilot kit, modified, powered by a 30 cc Super Tigre. Model is six years old. Photo by Wal Schubach at the Bunbury Nationals.

EW

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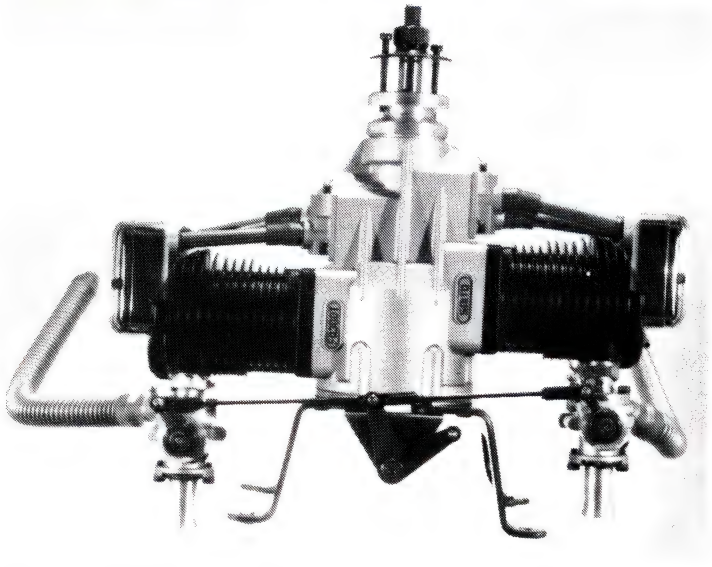
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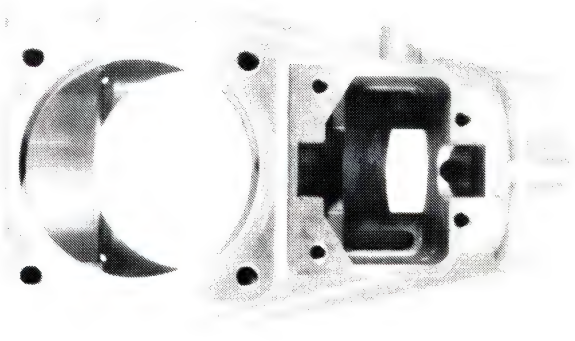
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Engine Review

SAITO FA300T-TDP



The classic lines of the Saito 300T. This is an humungous engine. Does anyone not understand the meaning of humungous?



High quality casting and machining evident in the Saito crankcase. Another pic that deserves some study.

THE THIRD WAVE

In the beginning there was the novelty of the OS .60 FS, and four-stroke engines gained a following. As time passed you could purchase almost any size up to 15 cc, in a number of brand names. The market became saturated and buying slowed down, so the next wave appeared, and these were the power machines. Design modifications increased power by 50+%, but some of the endearing qualities, such as easy starting, reliability and low fuel consumption were retained from the first wave designs. We are now entering the third wave, and the Saito 300T-TDP-AAC four-strokes per cycle engine is setting the standard. We have the easy starting, reliability and low fuel consumption of wave one, the power and torque of wave two and the factors of wave three: elegance, style and refinement; presenting an engine that is not only superbly functional but also with a realistic appeal for its special points and appearance.

First off, let us check out those letters in its name. The first T stands for twin cylinder, the next T is twin carburettor, the D is dual plug system (2 plugs per head; 4 in all), the P is pump system, and the AAC is Aluminium piston, Aluminium liner, Chrome plated. It will be some of these points that help Saito keep the lead in the larger than large engine stakes, as the refinements are those used on high performance full-size engines and also full-size aircraft engines. Consider the two carburettors. What is a twin but two engines grafted together? It is logical to fit a carburettor to each engine, particularly when it is a production line engine manufactured with - admittedly fine - engineering tolerances. It is quite a task to get hand-worked engines performing really close to each other, so you could not expect better with machinery off the production line. The slight variations of each engine are catered for by a tuneable carburettor, so why should this not be so when we graft several engines together to make a multi-cylinder unit?

By the time you have fitted this engine to a nice big model and installed a reliable radio and half a dozen servos, you have a fair bite of your pocket money hanging on the end of a radio signal. We certainly don't want any little problems, such as a flame out on landing or deadstick after a throttle-at-idle manoeuvre, to make the knees knock. Mr Saito has given us a nice little insurance policy for those problems by way of two glow plugs per cylinder. Not only do they take care of the worry of flame-outs, but they give the most superb starting and idle characteristics you would never think possible for a twin opposed engine.

Another neat idea is the pressure pump. The downstroke of the piston is an excellent pumping action, but its use is generally limited to just pumping the residual oil from the crankcase. By fitting two opposite acting one-way valves, Saito has made use of the crankcase pressure by converting it into an adjustable pressure pump for pressurising the fuel tank. On the aesthetic side, the satin silver crankcase, shiny black cylinders, gold rocker covers and blue and gold name plates make it a very attractive engine. After all, why shouldn't our fancy toys look pretty? There are many other features of the engine, but I will discuss these when we look at the components piece by piece as I spread them all out on the workbench for a close scrutiny. Take up your spanners and extension eyeball, and join me while I see what makes this beasty tick so nicely.



The rear case with bearing fitted. Note the gussetting around the bearing housing for maximum support.

SPECIFICATIONS

Cylinders	**2**
Carburettors	**2**
Glow Plugs	**4**
Bore	**34 mm**
Stroke	**28 mm**
Practical RPM	**1,600 to 8,400**
Weight	**1,800 gm**
Capacity	**50 cc**
Fuel Consumption	**80 cc/min (full throttle)**
Propellers	**18 x 10 to 20 x 10 inch**

CASTINGS

Well, I guess that is what Saito is all about, as the greater percentage of the engine is cast. As far as I can see, the only aluminium alloy parts machined from stock are the pistons, carburettor trumpets and the propeller drive disc. If you place that much reliance on your casting technique, you had better have all the answers, and I think it would be fair to say that Mr Saito knows what he is about.

The first casting I picked from the box of bits was the crankcase and, after studying it for quite a time, I wondered how many attempts were made at the prototype to come up with the correct answer. The case is one Lulu of a job that, judging by the superb finish in and out, has been made by the investment cast method. Apart from colour, the cast interior finish is every bit as good as the machined sections. There are little nooks and crannies serving some purpose wherever you look, and it is hard to believe that they have not been individually machined. The case is very sturdy, with plenty of metal where needed and re-inforcing gussets from the main body reaching down to the rear of the front shaft bearing housing. In spite of the robustness of the job, it is surprisingly light when you consider that it is a 50 cc twin engine. I would venture to say that it is lighter than the case of a similar size two-stroke convert engine. The external finish is an attractive satin silver, topped off with two blue and gold nameplates proclaiming Saito and 300.

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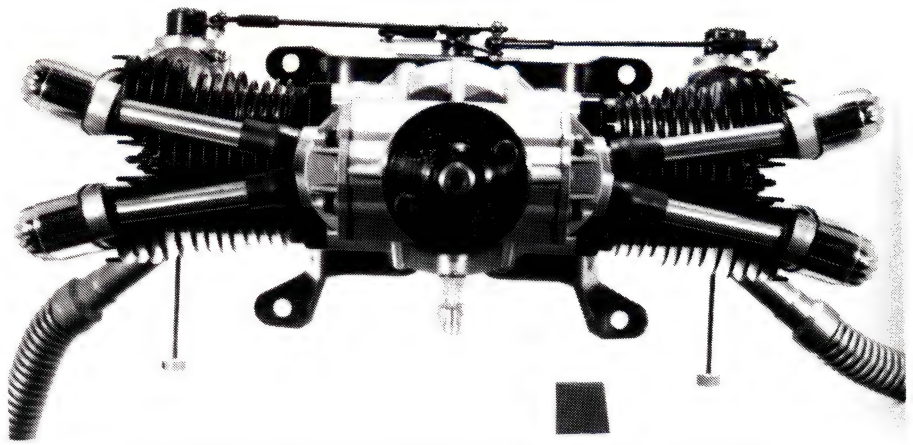
The backplate is another interesting piece that retains crankshaft bearing number 3. The plate is lightened where possible, but the actual bearing housing is gussetted 6 times for ultimate strength and to eliminate any possible movement that could lead to crankshaft whip (spinning around the centre line instead of on it).

The next casting out of the box was one of the barrels. To call it a barrel is short-changing it a bit, as it is not only the barrel but the liner and head all in one piece. Having all these parts in one piece solves a lot of problems for the owner, but requires special casting techniques by the manufacturer, as withdrawal from a two-piece mold is not possible due to the total shape. Being just one piece of metal eliminates different expansion rate problems, maximises cooling, does away with the need for bolts, gaskets, mating surfaces and means an end to problems of warping head or leaking head seals. Saito has perfected the chrome plating on aluminium task, and the bores on this engine bear testimony to the quality of the process.

The exhaust and inlet manifolds are at the rear of the head and are internally threaded spigots to receive a gland nut on both exhaust pipe and carburettor induction tube. Take your choice of plug positions, as there is one at the front and one at the rear. In practice, when installed in a model, you might consider having one plug in each head energised by on-board ignition at low throttle and the other plug(s) wired up to a socket for energising by your external power source for starting. You will probably only need to do this for the first couple of hours of use, as you will find that, when the engine is well run in, it needs no on-board ignition and will idle like a purring kitten with a tummy full of warm milk.

Back to the one-piece construction for a moment, as I heard someone whisper 'crash damage'. Yes, yes, I know. We build them to fly, not to crash, but no matter how well we build them there is still that off chance of a harder than normal landing. Well, it is my opinion that Saito thought of the off chance, and incorporated a bit of insurance into the barrel-head design. On top of the head of an overhead valve engine you find rocker gear and such, and this requires a snaft and pillar of some type. Over all this is the rocker cover. In a decent sort of 'hard landing' you might give this area a bit of a hefty thump and break off the rocker support pillar. Goodbye head! Not so with the Saito, as you will find a bolt-on pan that receives the rocker cover AND incorporates the rocker pillar. If it breaks it is a simple, inexpensive item to replace.

I'm speaking from experience here, as I have a 300T on my bench in pieces waiting for me to fit some new parts. It belongs to a customer who had the misfortune to lose radio contact, and his model went full power into the ground - very hard ground - with, as desribed to me by another modeller, such a bang that other flyers thought something had exploded. The model was returned to kit form (lots and lots of little pieces) and the engine had to be dug out of the dry earth. The steel mount was like a pretzel, induction tubes were a new shape altogether, as were the exhaust pipes and pushrod tubes, the carby manifold cracked, the front section of the crankshaft was slightly bent and the fins on the heads and barrels were full of course gravel and dry clay. One rocker box was askew slightly, but not damaged. When I removed it I found that the pan had broken around the locating spiggot. I removed the one holding bolt, transferred the rocker and shaft to the new pan and everything was back to normal (after re-spraying the head black to cover the gravel rash).



Front view of the big Saito. See if you can identify the points mentioned in the text.

On a lot of other engines this type of damage would have meant a new head, which would cost a lot more than the pan. Actually, the damage to the engine was a lot less than you would expect from such a bad crash, but it certainly says a lot for the robust construction. A lot of modellers come the ostrich act (stick their heads in the sand) when you mention crashes, but they do happen and should be a consideration when you purchase a new engine. How much damage is likely if the model crashes?

PISTONS AND CONRODS

The pistons are fully machined slipper style, and every effort has been made to reduce the weight. In fact, there is not much more to the piston other than a carrier for the ring and the gudgeon pin, with a little bit down each side to maintain stability. I receive quite a few questions regarding piston shapes and the purpose for all the machining on a four-stroke engine piston. The fact is that a manufacturer will always present his product in its best form by eliminating, as much as possible, any problem areas. One of the main problem areas with any engine is the vibration. Consider parts going up and down, side to side, round and round, with the weight position constantly changing and a pretty hefty explosion 5,000 times per minute, and you can see that there is a whole lot of shaking going on. The piston is being thrown away from the crankshaft only to be stopped suddenly and jerked back down again, once by an explosion, once by inertia, again at 5,000 times per minute (typical example at 10,000 rpm) for each action, and this action alone tends to add a considerable amount of shaking.

Consider tying a glow plug spanner to a short length of string and flicking it from side to side. You can feel a fair bit of tension on the string as it reaches the end of its travel each way. Remove the spanner and replace it with the glow plug. This time it is hard to feel the weight changing direction. Same goes for a piston. Mr Saito is down to the absolute bare essentials in his piston design, and that is a crown (top) to act on the gasses, a groove for the ring, minimum bearing support for the gudgeon and a narrow section of skirt (part below the gudgeon) to maintain lateral stability and a quality of material and design to withstand the rigours of explosions and the aforementioned up and down forces. This design of the piston plays a big part in the smooth runniung of the engine. (The reason this cutting and chopping can't be done with a two-stroke piston is because it would play havoc with the porting as the piston acts as a valve on the port openings in a two-stroke engine.

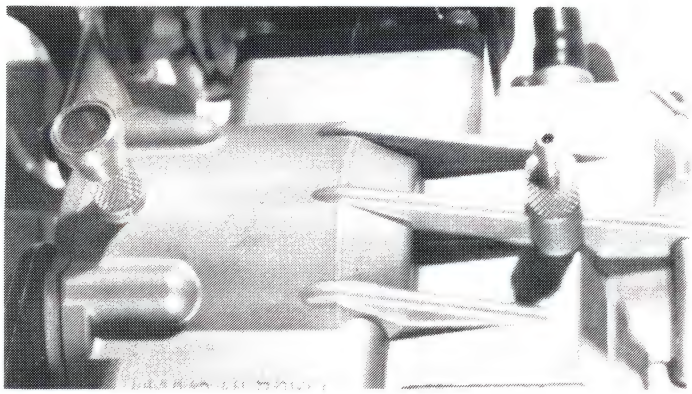
The valves come a fair distance into the combustion chamber when open in this engine - so much so that the top of the piston has two reliefs machined in the crown to avoid contact. One ring only is used and the gudgeon pin is fully floating (moves in the piston and the little end of the rod) and is fitted with teflon rub pads to stop liner scoring.

The conrods remind me of days past when I used to work on full size car engines, as they are miniature replicas. Forged from aluminium alloy, they are sturdy in construction and a bit of a departure from what we usually see in model engines. The bronze bushed little end is as big as a large big end, and the big end is a huge hole at 13 mm inside diameter. As the crankshaft is two-throw, one-piece, the big ends of the rod are split and bolted into position. Similar to full size practice, bronze slipper bearings are fitted, which brings to light an interesting point of manufacture. If the big ends were just bronze bushed in the usual way, it would have been difficult to hold the bushes in position, and the side bearing area would have been almost useless.

To understand the slipper bearings, imagine the square-sided rim of a sport type pushbike wheel - low-sided U shape - and that rim is cut in half across the diameter. The two pieces you end up with resemble slipper bearings. (Slipper comes from the original, true name - slip-in bearings.) When the conrod is shaped, the big end area is slit in half at 90° to the vertical centre line. The main part of the unit is now the bearing, and the half round bottom piece is the cap. The pieces are then bolted together and the hole is machined to size for the slip-in bearings. The unit is then taken apart, the slip-in bearings fitted and Scotch rivetted in place. (Scoth rivet = dimpled with a small or centre punch to blend the edges of both metals.) The cap is again fitted and the bearing surface is then generally given just a light surface finish by machine or reamer. A lot of work, but all in the interest of a quality product.

THE CRANKSHAFT

The crankshaft starts its life as a length of



One-way valves in the crankcase provide pressure to the fuel tank. Inlet has gauze filter, outlet has nipple for fuel line.



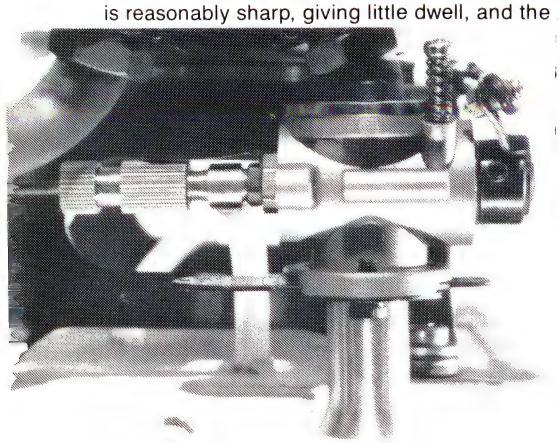
Connecting rods showing split big ends and bronze bearing inserts. Scotch rivetting marks are visible in 3 places. Is that an F for Front?

45 mm diameter chrome molybdenum bar stock about 170 mm long, and approximately 22 machining operations later ends up as a piece of workmanship that is a delight to the eyes of model engineers. All working surfaces are finely ground, and every diameter finishes with a small radius which is good engineering practice to eliminate weak areas. The two-throw shaft is supported by 3 ballraces (2 x 17 mm & 1 x 10 mm i.d.), and is drilled 9 mm diameter from the rear for a depth of 63 mm, for lightening purposes. The camshaft driver gears are pressed on and located by a pin, and the propeller nut thread is 8 mm x 1 mm pitch.

Prop driver disc is 34 mm face diameter and is of the tapered, split-cone locking arrangement. Prop nut is tapered one end, split and fits into a conical depression in the washer for locking purposes. Provision is also made for securing the prop with two 3 mm cap head screws into the prop driver. Even with all this I felt much happier when I added a lock nut after the main nut when I considered the power of the engine and the size of the prop. (I have ridden motorcycles in days past that had smallere capacity engines than this, and the engine performance was way below what you get from the 300T. I'm thinking of stowing it in the saddle bag of my BMW just as a spare.)

THE OPENING AND CLOSING BITS

The cams are an interesting profile with, obviously, a lot of thought behind the design. The exhaust cam is peaky with a bellied out radius on the lift side which would give a reasonably slow opening for less exhaust noise. The peak is reasonably sharp, giving little dwell, and the fall is flat for a quick closure. The inlet cam is all dwell on the peak to allow maximum gas in with the valve fully open for the longest possible period. The cam followers are shaped a bit like a flat-head nail with a thick shank, and they slide very smoothly in long, bronze bushes which also serve as the retainers for the rubber boots that seal the pushrod tubes.



The throttles look like the sort you would expect on a high performance motor cycle. Not for neelde fiddlers.

The valves are stainless steel with a face diameter of 14 mm, and they are locked into the spring with tapered, split collets. On the whole a nice arrangement of components.

CARBURETTORS

The carburettors are the twin needle type; one needle for high speed, one for idle mixture; and are fitted with throttle stop screws and sliding plate choke. The air intake is a long trumpet which gives the carbs a rather racy appearance. There are precise instructions for setting the carbies, which must be adhered to for engine performance and prevention of damage due to uneven running. Both the carby needles are set as specified for the initial start, then minor, if any, adjustments are made for full synchronisation. After that the pressure adjusting needle is adjusted to give about 200 revs below top speed. Once set, you should not fiddle with the needles, as an engine of this size is not so fussy about minor climatic changes.

You will need to fit the extension to the main needles, as the normal adjusting barrel is just a tad too close to the hot section of the exhaust pipe. The pressure adjusting needle will be a new one to you, as it is a new idea by Saito (patent pending) whereby the crankcase pressure is utilised for pressurising the fuel tank. This has been made possible by the addition of two valves in the crankcase. One is filtered air in only, and the other is compressed air out only, and this goes to the needle adjustment then to the tank and excess pressure bleed-off tube. New, but not frightening, as it is a lot simpler than it sounds and it is a set-and-forget piece of equipment that is certain to crop up on other engines in some way to get around patent problems.

You have only one hook-up to the carbies, as the cross linkage has already been done for you with great precision. A V shaped bellcrank is fitted and connected to the linkage, and the effort is so light that the smallest of servos will be adequate for throttle operation.

Starting procedure is simple and is done as set down thus: Turn the propeller three times in the running direction to pressurise the tank. Close the chokes and turn two more turns with throttle fully open. Open chokes. Turn prop once to check for hydraulic lock. Set throttle to low position, turn prop clockwise to compression then back 180° (half turn). Connect plugs and flick prop clockwise for an instant start and the sweetest sound you have ever heard from a model engine. A short run-in of about 20 minutes at 2½ to 3 thousand rpm is all that is required, and this is only necessary for the conrod and gears.

A FEW MORE BITS AND PIECES

The exhaust pipes are sure to please even the most fastidious modeller as they are 250 mm long and fully flexible stainless steel; bend them to exit wherever you like. The short length of tube on the bottom of one of them is to connect the excess pressure tube so that sump oil will not foul the model.

The engine is set up with a steel, radial mount that is completely adequate for holding the engine but light enough to collapse and absorb the impact of one of the aforementiioned hard landings without damaging the crankcase of the engine: nice touch Mr Saito!

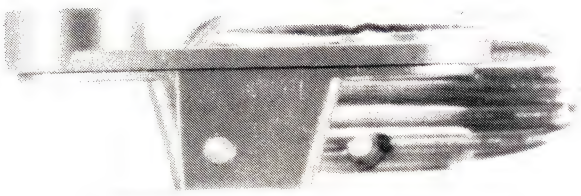
Not only do you get an engine in the nice silver box, but there is also a bag of accessory goodies that includes:

1 screwdriver for idle needle adjustment;
1 spanner for tappet adjustment;
1 tappet feeler gauge;
4 Allen keys - assorted sizes;
1 spanner for the muffler nuts;
1 offset ring spanner for the prop nuts;
2 choke levers;
4 glow plugs (Saito P2);
1 set harness for plug connection;
2 leather washers for use with spinner;
1 set engine mounting bolts c/w blind nuts;
2 M3 caphead bolts for propeller mounting;
4 knobs for extension needle and choke rods;
1 special prop nut for use with bolt on spinner;
4 spacer washers for engine mount to prevent mount from digging into firewall;
5 pages of instructions.

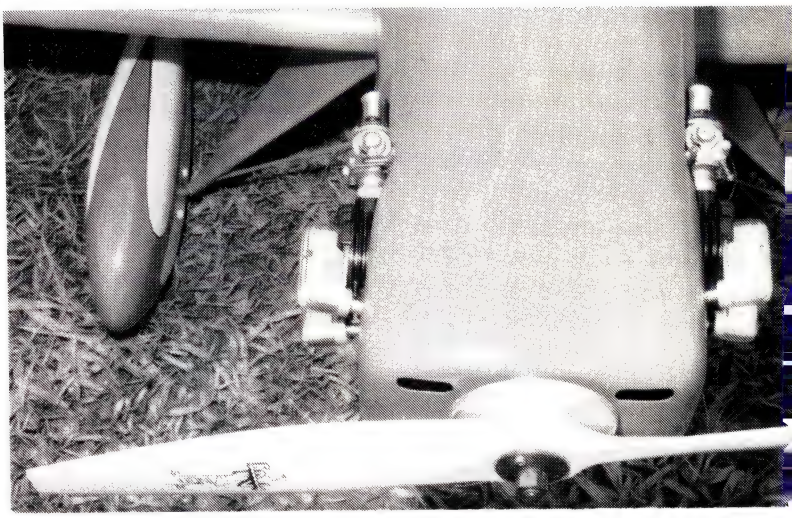
What more could you want?

THE FIRST BURST

Rather uneventful actually. Obviously the engine would not fit on my standard test bench, so I made a wooden mount for it and set it up on a special stand I have for larger than large engines. I filled the tank with Magnum four-stroke fuel. Strangely, Mr Saito does not recommend a specific fuel other than castor or synthetic oil with 5 to 15% nitro, as sold on the market. I guess I did the correct thing, as Magnum is a fuel on the market. Actually, after looking into the engine, I would recommend nothing less than the Magnum mix which is 10% synthetic, 5% castor, 10% nitro and methanol. I will wean mine off nitro



Replaceable rocker bracket in front of gold rocker cover. Looking after an engine like this needs a motor mechanic!



The Saito 300T fitted into a Sig Space Walker. Gives the impression that model and engine were made for each other. Prop is 18 x 10.

later and see how it likes a drop of petrol in the fuel.

I then did all the things set down and, finally, it came to the moment of truth. I flicked the prop and the engine started and ran. It ran beautifully, sweetly and evenly, and sounded magnificent. Anybody who has been with me for a while in the magazine will know that I am not a lover of converted engines: chainsaws, leaf blowers, mowers and the like. If you are going to fly model aircraft then use a model engine, an engine specifically designed for model use. Leave the others for cutting wood, grass or whatever, but do not fit them in models (Winch's Law).

Anyway, as I was saying, when that engine was running I thought then, how could anyone bolt a shaky chainsaw engine to a model when you could have pure power with this engine that also looks like an aircraft engine? When you open the taps (advance throttle) on this beast, that big fan at the front really claws at the air and the pipes give a cackle that stiffens the hair on the back of your neck. Throttle response - transition - is instantaneous, and idle is as smooth as an electric wrist watch. Some machine! I will not degrade the engine by listing prop figures, as this is not a machine to be trifled with by trying a range of props for rpm. Just let me say that, using props in the recommended range, the power was adequate and the rpm stayed close to the maximum 8,400 throughout the range.

If you are considering a large model - a powerful, aerobatic, large model - or just feel like indulging in something that is elegance in engineering, ring your nearest Saito dealer and ask him to start wrapping one up for you. You'll be hard put to find better. The test engine was supplied by Ken Anderson, head honcho at The Hobby Headquarters, Unit 14/10 Yalgar Rd., Kirrawee, 2232; phone (02) 545 1944.

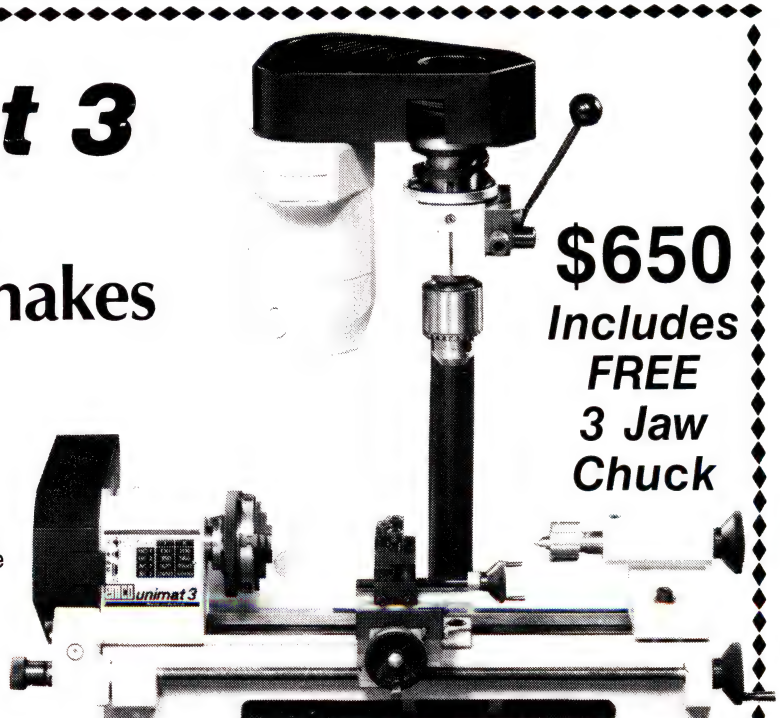
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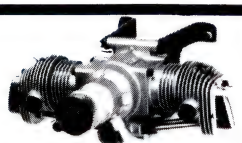
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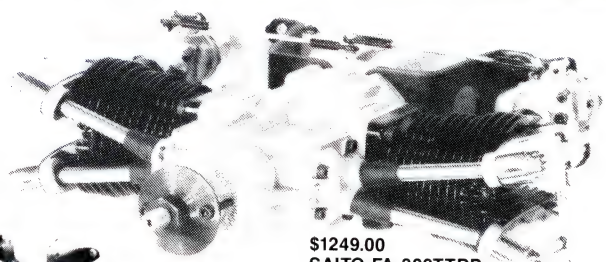


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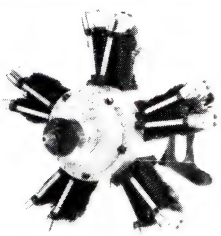
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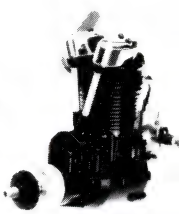
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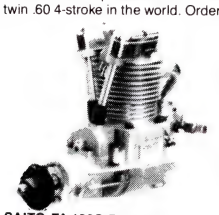
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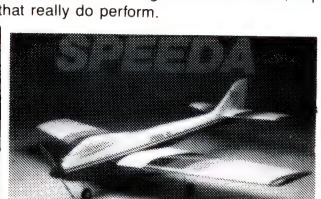
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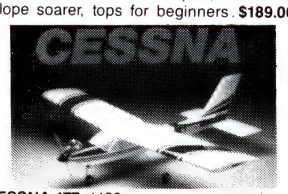
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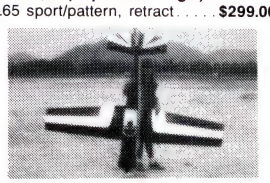
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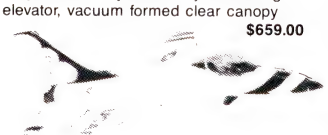
ARCOMASTER .40 (Arrow): 1400 mm span sport/pattern, .40/.46 ..... **$245.00**
.60 Size: 1600 mm span, retracts **$335.00**

YELLOW AIRCRAFT: These magnificently finished, almost-ready-to-fly aircraft consist of pre-built fibreglass fuselage and balsa sheeted foam wings, with leading and trailing edges fitted. Full instruction manual. The CAP 10B has firewall and bulkheads installed, fibreglass cowl and wheel pants, preformed heavy duty landing gear, vacuum formed clear canopy, built by Funkey ..... so you know it's good! Full 'French Connection' decal set included.



CAP 10B: span 75 inch, 980 sq inch, 13-17 lb, 1.20 4-stroke **$599.00**

1/9 Scale F-16A FALCON: Span 44 inch, length 67 inch, 8½ to 10 lb, Pre-moulded intake and exhaust ducts, pre-cut ply bulkheads, glass moulded ventral fins, heavy duty aluminium yoke and nylon bearing for elevator, vacuum formed clear canopy
$659.00



YELLOW AIRCRAFT

DOUGLAS A4 SKYHAWK: 40 or 45 inch span, 580 or 653 sq in., accepts Dynamax fan, separate access hatch, pre-moulded fibreglass ducting and gear pods, precision pre-cut ply bulkheads..... **$499.00**

1/10 Scale F4E PHANTOM II: span 43.5 in., length 68 inch, 9-11 lb, Fuselage has scale panel lines, recessed glass for hatches, all formers pre-cut, scale stabilator, dropped LE on pre-sheeted dihedral tips, glass ducts with bifurcated exhaust,, exhaust cones with turkey feathers, glass splitter plates, vacuum formed clear canopy, takes a 5 inch fan, no cheater hole required. Single fan.
$739.00



COMBO SPECIAL: Take any Yellow Aircraft Ducted Fan kit and we will include:
Dynamax Fan, OS 91 VR DF ABC Engine and Spring Air Retracts, for an additional $799.00

SERVOS
HHQ Standard Size Servos, suit Futaba, JR,. Sanwa; FM, AM. *State connector required.*

$21.00 each; or 4 for..... **$76.00**

SUPER SPECIAL
on AM Type Futaba connector Servos
$19.95; or 4 for **$72.00**

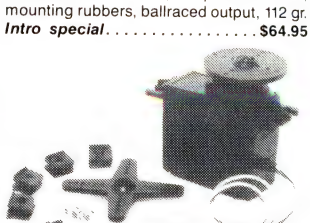
Japanese Mfr. HHQ Micro Servo
12.5 x 31 x 29.5 mm case size
1.4 kg-cm torque, 19 gm, 'TINY',
metal gears, ballraced output,
connector suits most RC systems
$62.95; or 3 for **$179.00**

JR 507 SERVO
Suit most RC systems, 2.9 kg-cm torque, .27 sec/60°, 46 gr



$36.95; or 3 for **$99.00**
or 6 for **$174.00**

HHQ H/DUTY SERVO
12 kg-cm torque; ideal for large scale aircraft, boats, cars etc., complete with horn, mounting rubbers, ballraced output, 112 gr.
Intro special **$64.95**



DREMEL FREE WHEELER
2 Speed Cordless Moto-Tool with keyless chuck. Ideal for any modeller.

Retail: $145.00
SALE **$96.00**
Ask us about our special bag of accessories for the Free Wheeler at SALE PRICE.



K & B ENGINES

MARINE ENGINE SUPER SPECIALS

K&B 3.5 cc Outboard Marine **$199.00**
K&B 7.5 cc Outboard Marine **$259.00**
K&B 6.5 cc Inboard Marine **$149.00**
K&B 11 cc Inboard Marine **$359.00**
K&B 20 RC Sportster **$79.00**
K&B 45 RC Sportster **$105.00**
K&B 40 RC (Ball Bearing) **$129.00**
K&B 61 RC (Ball Bearing) **$159.00**

THE HOBBY HEADQUARTERS is the Factory Supplied and Appointed Distributor for K&B Products. Our Spare Parts back-up is building rapidly
Our 'Labour Free' repair facility applies.

BATTERIES

500 mAh Cells, Saft or National . . . **$2.95**
500 mAh Cells, Saft tagged **$3.59**
600 mAh Cells, Sanyo tagged **$4.69**
700 mAh Cells, Saft tagged **$4.89**
1300 mAh Cells,
Sanyo KR 1300 SC tagged **$7.89**

RADIOS

Futaba Bionic Gold 2 Ch Reversing, 2 servo, 29 MHz, AM **$99.00**
Sanwa Dash 2 Ch Reversing, 2 servo, 29 MHz, AM **$95.00**
Hi-Tec 455, 4 Ch, 3 servo, Dual Rates, Reversing, 36 MHz **$189.00**
with nicads and charger **$269.00**
Hi-Tec 455 PCM, 4 Ch., 3 servo, Dual Rates, Rev, Nicads, 36 MHz **$319.00**
Hi-Tec 550 PCM, 5 Ch, 4 servo, 36 MHz, Dual Rates, Rev, Nicads **$395.00**
Hi-Tec 720, 7 ch., 36 MHz FM, 4 servos, Dual Rates, Rev, Mixing **$349.00**
or with Nicads **$419.00;**
or with Nicads and Charger . **$445.00**
Futaba Attack 4 Ch, 36 MHz FM, 3 servo, Reversing **$299.00**
or with Nicads and Charger . . . **$379.00**
Futaba Conquest PCM 5 Ch, 36 MHz, Dual Rates, Rev, 3 servo, Nicads, Charger **$529.00**
Futaba 7UAP, 7 Ch, PCM, 36 MHz, 3 x 3001 servo, mixing, rates, rev, memory, nicads and charger, computer readout **$759.00**
JR 5 Ch MAX, 36 MHz, FM, dual rates, rev, 4 x 507 servos, nicads and charger $469.00
NEW! Sanwa Vanguard 4 Ch, 3 servo, 29 MHz, AM, reversing **$199.00**
or with nicads and charger . . . **$279.00**

The easiest to apply and most durable EPOXY PAINT AVAILABLE
K&B SUPER POXY PAINT —
for the "Ultimate Finish"

A development of the space age, Super Poxy Paint is formulated exclusively for models ... mix and use (NO WAITING TIME — NO HAND RUBBING). Fast curing and quick drying, it sets up rapidly for minimum dust adherence. Stays glossy longer, least affected by ultra-violet sun rays or manufactured fuels.



FOURMOST RECOIL TUBING

A 6 ft length of super tough, fuel-proof urethane tubing preformed into a coil. Allows placement of your field box and fuel can a convenient distance from your aircraft or boat. After use the tubing will retract to its earlier space-saving form. The tubing will withstand gasoline and diesel as well as glow fuel. 1/8 inch ID. Cat. No. 135.

Retail: $14.95; SALE **$10.95**



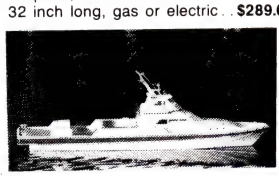
HOBBY HEADQUARTERS "SUPER FUELS"

Formulated from aviation grade Methanol, 1st Pressing Castor Oil, 1st Grade Nitro Methane, Corrosion Inhibitors, Anti-Foaming & Wetting Agents plus Detergents. Blended to specifications of leading model engine experts and manufacturers. We will also blend fuels to your requirements at 'Super Low Prices'.

	FAI	5% Nitro	10% Nitro
2 Ltr	$7.95	$9.49	$11.75
5 Ltr	$14.79	$20.99	$24.99
20 Ltr	$39.95	$67.50	$87.95
4-STROKE			
	0% Nitro	5% Nitro	10% Nitro
2 Ltr	$7.75	$9.79	$11.49
5 Ltr	$14.49	$19.99	$24.99
20 Ltr	$39.95	$61.50	$81.99

*DUMAS BOATS
from the 'Model Boat People'

These superb wooden and glass kits offer excellent value and high performance.....
Deep Vee 40; 32 inch long for .40 inboard marine **$139.00**
Shelley Foss Tugboat; 36 in. long for gas or electric **$259.00**
American Enterprise; hi-speed, off-shore cruiser, 32 inch long, gas or electric . . **$289.00**



PT 109; WW2 Torpedo Boat, 48 inch long, 12¾ inch beam, gas or electric, features hand laid-up glass hull and clean die-cut plywood decks and superstructure **$599.00**
Hot-Shot IV; 29 inch long for 3½ outboard **$139.00**
Hot-Shot 45 Tunnel; 35 inch long for 7½ outboard **$199.00**
Miller American; 1/8 scale hydro, 43 inch long, .60/.67 engines . . **$359.00**

BEGINNERS' SPECIAL

Futaba 4 Ch. Attack 36 MHz FM
with Reversing, Nicads, Charger, 4 Servos
+ K&B 40 RC Ball Raced Engine
& Pricerite Western Trainer 40 kit.
$599.00



ADHESIVES

	½ oz.	1 oz.	2 oz
ZAP	**$4.80**	**$7.90**	**$14.90**
C/A	$4.80	$7.90	$14.90
Zap-A-Gap	$4.80	$7.90	$14.90
Slo-Zap		$8.80	

Flex Zap 20 gm **$11.95**
Z-7 DeBonder **$5.00**
Zip Kicker; 2 oz. sprayer **$7.95**
Zip Kicker; 8 oz. refill **$14.95**
'Z' Ends **$5.15**
Poly Zap for Plastics; ½ oz. **$7.70**
SIG Corebond; 16 oz. for foam cores, veneer, balsa or ply, brushes wash out in water **$17.95**
Willhold RC 56; for canopies **$5.99**
5 Minute Epoxy; 2.5 oz. **$6.95**
5 or 30 Minute Epoxy; 9 oz. **$16.50**

We stock:
Balsaloc, Balsarite, Clearcote, Solarlac Paints & Thinners, Aircraft Shrinking Dope, Formarine Polyurethane Paints.

PNEUMATIC RETRACT AIR PUMP

With Gauge. Suits all makes.



Retail: $79.95 SALE **$54.95**

SPRING AIR RETRACTS

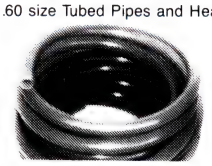
Lock down if air is lost. Accessories available.



Trike Firewall or Belly Mount **$220.00**
or with above pump **$270.00**
Trike Slimline (No. 301 fits in 26 mm deep wing) **$220.00**
or with pump **$270.00**
Mains Only **$169.00**
or with pump **$219.00**

TOP GRADE IMPORTED SILICONE TUBING

Suit .60 size Tubed Pipes and Headers.



Less than ½ Price!
Retail . . . . . $24.50 per 300 mm
SALE . . . . . **$11.50 per 300 mm**

AIRCRAFT KITS

Check Our New Arrivals .... and Super Discount Prices!!!

PRICERITE

Quiet Advancer **$64.95**
Western Trainer 40 . . . . . **$105.00**
Red Zephyr **$89.95**
Buzzard Bombshell **$89.95**
Playboy Senior **$89.95**
Powerhouse **$109.95**
Trenton Terror **$82.50**
Simplex **$72.50**
Pronto; 1500 mm span, .40/.45 . . **$114.95**
Fun Fly; 1422 mm span, .25/.40 . . **$61.95**
Sequel 2000; 2M comp. sailplane **$109.00**

Fresh from the USA:
TITEBOND WOOD GLUE —
'The Original Aliphatic Resin Glue'.

4 oz **$3.59**
8 oz **$5.29**
16 oz **$8.95**



FUNKEY HELICOPTER MAIN & TAIL ROTOR BLADES

Funkey Helicopter main and tail rotor blades; suit Hirobo .60, constructed from 3 different woods, precision finished and balanced, complete with heatshrink covering.

Main Rotor pr. **$29.95**
Tail Rotor pr. **$12.95**



dynamax



Available Now
DYNAMAX FAN
.60/.90 engine, 10 lb static thrust, 170 mph exhaust velocity.
$219.95

ACCESSORIES

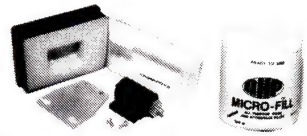
Perry Oscillating Pump **$46.50**
Perry Regulating Pump **$51.50**

NEW ITEM
PERRY REGULATING PUMP:
Gas/Diesel or **Smoke Fluid!** **$51.50**

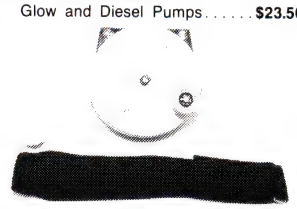
Hi-Point Boat Prop Balancer **$44.90**
Heavy Duty Wire Bender; 10 mm steel with Hi-Tensile steel studs, bends up to 4.75 mm spring steel, including coils **$29.95**



NHP Wood & Styrofoam Filler; 8 oz., screw top tub **$7.95**



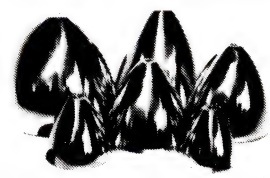
Dave Brown 6 Shooter Glow and Diesel Pumps **$23.50**



Bruline Air Filters; Fine or Course . **$6.50**
Bruline Replacement Filter Elements **$5.95**

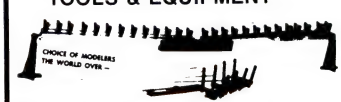


Sullivan 601 Heavy Duty Starter . . **$57.95**
Thunder Tiger Heavy Duty Starter **$46.95**



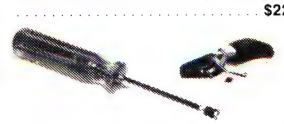
Australian made, high quality aluminium spinners: 1½ inch to 6 inch diameter, to suit any engine. Custom made contours available at very reasonable cost.
Custom made cowls also available.

TOOLS & EQUIPMENT



Full House Adjusto-Jig; wing and fuselage jig complete.
Must-Have Item **$159.00**

Plug Wrench; socket fits neatly over plug. Ideal for cowled engines
Screwdriver type handle **$13.90**
Chromed Modellers' Wood Plane, - not a razor plane. High speed steel blade. You'll never use a razor plane again. **$22.95**





L.R. Taylor Power Pacer Auto Battery Cycler & Charger **$189.00**

NEW ITEMS!!
*Glass Cloth; Ultra light weight; - ***0.6 oz.***, 38 inch width, per metre **$10.95**
*Willhold RC 56 Canopy Glue; 4 oz **$5.99**
*Dynaflite 2M Upstart Short Field Glider Launch Kit **$64.95**





BUST PILOT KIT

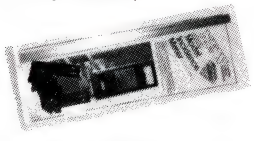
This is the lightest bust pilot available. It can be assembled as either a Sportsman or Barnstormer

*DGA Pilots: 1/8 to 1/3 scale, bust & full bodied; jet and sportsman busts, full bodied sportsman or barnstormer. Ultra light weight, minutely detailed. ***Very reasonably priced.***

*Major Decals, most National Markings, .40, .60 and ¼ scale.
Also prop decals and kill markings.
*SIG Epoxolite; special epoxy compound for fillets
*SIG Easy Hinges; probably the best and quickest to install hinges on the market.
*SIG Control Line Fuel Tanks, Control Lines, Lite Ply.
*Bondhus Imperial and Metric 'L' type balldrivers.



*Dave Brown Engine Mounts and Wheels.
*HHQ Glass Arrowshafts; ideal for model pushrods, 5/16 x 32 inch . . **$3.70**
(end fittings available)



*Robart New Jewelled Movement Incidence Meter; *must-have item.* Set or check wing or stab incidence, engine thrust line, checks wings for warps or use to set wash-out **$48.95**

*KHP Uni-Mask; a simple, very effective filter face mask for protecting against hazardous dusts such as balsa, foam, fibreglass, paint, glue etc. Very light and comfortable. Packs of 6 . . . . . **$3.50**
What price for your health!
*Trexler Balloon Wheels & Pumps.
These latex rubber wheels are the authentic original 'Old Timer' wheels used on pre-WW2 models. Available in 2¾, 3, 3½ and 4½ inch.
Pocket size air pumps available



*SIG Koverall is available again!
This lightweight polyester based fabric shrinks tight with heat, very high impact strength, easy to apply, accepts all common model paints, weighs 1.25 oz per sq yard, Available in 48 x 72 inch at **$17.95**
or 48 x 180 inch at **$38.95**

Bruline Boat Antenna; excellent base mount, designed for the job **$7.50*
*Bruline Waterproof Switch; no boat enthusiast should be without . . . **$19.95**
*Robart Super & Ultra Fuellers

*APC High Performance Composite Props All wanted sizes. Advanced, precision props to dramatically increase performance and decrease prop noise.

*AT LAST! Model Airplane Newa 400 Great Modelling Tips by Newman **$19.50**
*Harry Higley's Books: Master Modelling, Tom's Techniques, There are No Secrets **$19.25**
Getting Airborne I and II (each) . . **$23.95**
*How To Fly 'U' Control by Mathis . **$9.95**

*ADC Mini Sander; versatile hand belt sander with cushioned sanding belt **$4.99**
(replacement sanding strips available)



CALL US FOR ROSSI ENGINES



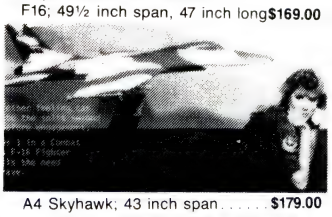
Need a new receiver or transmitter nicad pack? Select any of the above tagged cells and multiply by the number of cells required, add $7 for receiver packs and $12 for transmitter packs. All packs heat shrink covered, with leads. Just add your own connector, or we will fit for a little extra.

12 volt, 6.5 Ah cell **$44.95**
and with charger **$69.95**

*Zinger Props; large range, also multiple blade.
*Complete Set Frank Zaic Year Books; 15 books in all, includes: American Boy, 1939 National Model & Airplane Meet, Glider Design and Hoffman's Book **$189.00**
Williams Bros Wheels, Pilots, Plastic Kits, inc. machine guns, aircraft, etc., etc.
*KHP Flex-Mask; an ultra flexible masking tape, lays flat around ½ inch radius curve, extremely thin, low tack, comes in 108 ft roll,
1/8 inch wide for small models **$5.99**
1/4 inch wide **$7.79**

TOP FUN

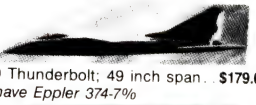
*Combat Models;, full range available, limited stocks. These high performance slope soarers are fantastic:
F16; 49½ inch span, 47 inch long **$169.00**



A4 Skyhawk; 43 inch span **$179.00**



MIG 27; 45 inch span **$179.00**



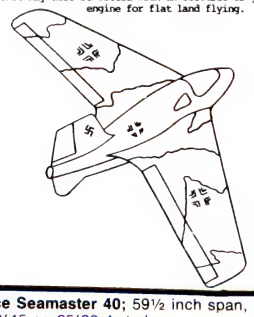
A-10 Thunderbolt; 49 inch span . . **$179.00**
All have Eppler 374-7%

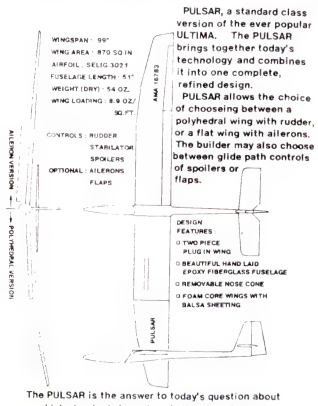


***SUPER HIGH PERFORMANCE SAILPLANE COLLECTION: These superb high quality sailplanes are by Bob Sealy and feature magnificent epoxy glass hand laid fuselages, precision cut foam wing cores, balsa sheeting and building instructions.**

MESSERSCHMIT ME 163 . . . . . $165.00

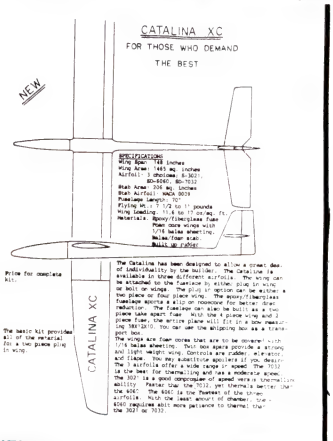
A 1/8 scale slope soaring plane that is a ball to fly. The kit features a fiberglass fuselage and foam core wings that are to be balsa covered by the builder. Wings are detachable for ease of transportation. Specs. are 44" wingspan; 300 sq.in. of wing area, and a flying wt. of 24 ounces. The Komet may also be fitted with an electric or glow engine for flat land flying.



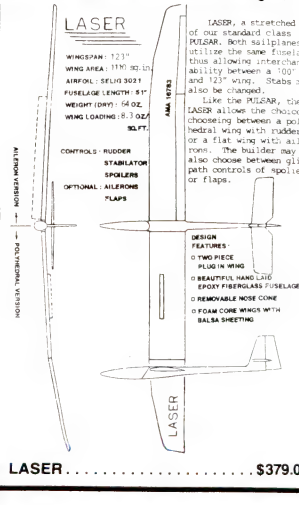


The PULSAR is the answer to today's question about which standard class plane is the plane for you.

PULSAR 349.00



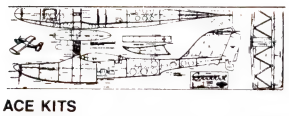
CATALINA XC $579.00



LASER $379.00

Ace Seamaster 40; 59½ inch span, .40/.45 or .65/.80 4-stroke.
Excellent water handling features, converts in a few minutes to a land plane .... delightful to operate **$229.00**





ACE KITS
4-20; 1232 mm, .15/.20, .20 4S . . **$109.00**
4-40; 1448 mm, .20/.40, .40/.45 4S **$129.00**
4-40 Bipe; 1219 mm span, .35/.40 or .40/.50 4-stroke **$159.00**
4-60; 1778 mm, .40/.46, .60/.90 4S **$169.00**
4-60 Bipe; 1473 mm span, .60 or .60/.90 4-stroke **$229.00**
4-120 Bipe; 1778 mm span, .90/1.08 or 120 4-stroke **$339.00**
Sport T-34; 1423 mm span, .35/.46 or .45/.65 4-stroke **$145.00**
1/6 Scale Cap'n'Eddy Pilot **$15.70**
1/4 Scale Cap'n'Eddy Pilot **$22.95**

GREAT PLANES
Super Sportster .40; 56 inch span, .35-.45 or .40S-65 4-stroke **$139.00**
Sportster Bipe .40; 45 inch span, .35-.45 or .45S-65 4-stroke **$159.00**
Super Sportster .60; 61 inch span, .45-.61 or .65-.90 4-stroke **$179.00**
Super Sportster 90/120; 72 inch span, .60-.91 or .90-1.20 4-stroke **$215.00**
Super Aeromaster Bipe; for .65 to 1.20 4-stroke **$225.00**

Announcing the latest high performance, superbly finished glass hull boats produced for the Hobby Headquarters. Available with separate hull and deck, or completely finished with joined deck, trim striping and windows. All suitable for gas or electric.

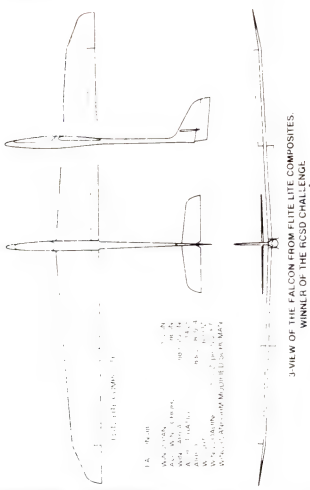
007 Targa Classic; 915 mm **$139.00**
Finished **$229.00**
008 Targa Cruiser; 915 mm **$155.00**
Finished **$239.00**
009 Fly Bridge Cruiser; 915 mm **$169.00**
Finished **$255.00**



JUST IN! — HUGE DU-BRO SHIPMENT

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ELECTRIC FLIGHT

by Phil Stevenson

NATIONAL ELECTRIC RALLY; Wangaratta 1990

This year's rally had several firsts over the previous two events at Armidale and Nowra. For the first time we flew on all days allocated, losing only an hour or so to rain on Sunday. For the first time we included some pylon racing events and, also for the first time, we had three states represented in a total entry of twenty two.

When we wrote the programme we knew it would be a very busy weekend. We were to try and fit in four rounds each of Open Duration, 7 Cell Glider, 7 Cell Pylon and Foamy RTF Pylon, as well as time for sport flying. As it turned out we had to miss the last round of the two pylon events due to rain, but we all enjoyed the racing so much that it will certainly be on next year's programme.

Seven Cell Glider, sponsored by Wings 'N' Things, was flown to the 5 minute national rules, with flying in groups and group scoring. To do well these days, less than 30 seconds motor run is needed and all landings must be in the inner 15 metre diameter landing circle. Despite the Astro Mini Challengers with various power plants, the winner was Bob Hickman flying a larger model powered by an Astro 05 FAI with gearbox and folding wooden prop. Not far behind were the Mini Challengers of Cliff Fiddes (Hectoplet 274), Ray Cooper (AP36 and Altec gearbox) and Peter Pine (Hectoplet 274). Sanyo 900 SCRs dominated, with some using the new 600 SCRs, but occasionally running out of juice in the poor lift.

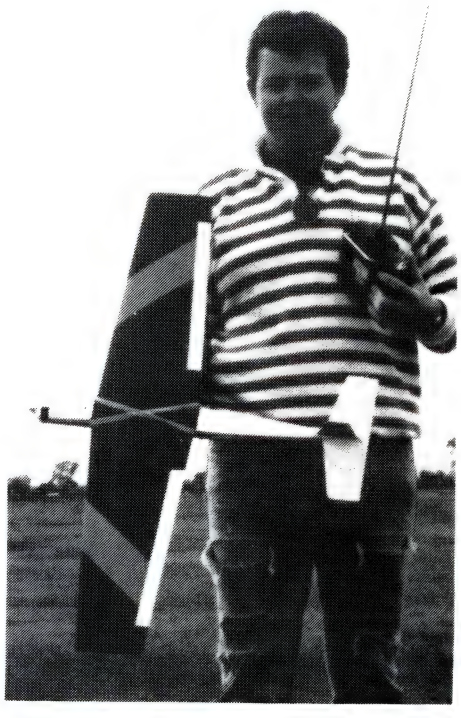
Bob made it a double by also winning Open Duration, sponsored by Astropower-Leisure Australia, with the same model. This event was dominated by the 7 cell gliders and, despite bonus motor allowances for ROG, only two or three entrants flew Old Timer or cabin models. In the final round there was a mass launch of 14 aircraft in an "all up, last down", and appropriately Bob Hickman won again with about 25 minutes, although he did have a long walk downwind for recovery. Other places were filled by John Rourke and Cliff Fiddes.

Foamy RTF Pylon Racing was the inspiration of Macquarie Club secretary, John Rourke. Aimed at the small Union models, only the seven Macquarie Club entrants turned up with Union models, so the event was thrown open to all other RTFs. Cliff Fiddes, with a Windcruiser glider, proceeded to win. David Hobby's Flash was second from Richard Tapp's Juicer, with John Rourke leading the Union models.

After each round of RTF racing came the big guns, the 7 Cell Racers, but unfortunately only David Hobby had done his homework preparation and managed to get his fast to model to survive test flying. His model is based on photos of European racers and uses a Kyosho 240 WS, a very hot car motor. It was noticeably faster than everyone elses, and sometimes lapped others twice in the races, which were shortened to 8 laps to get as many finishers as possible. Back in the field, though, there was some great jousting and we all enjoyed the event immensely.

A significant observation I made was the relative absence of models using more than seven cells. Peter Pine flew his World Champs F3E 27 cell model for a couple of demos, and I think the only other was David Ray's 14 cell Astro 25 powered full size Buzzard Bombshell Old Timer, beautifully built from a Trinder kit. David also flew a small but very realistic SE5A powered by a Union geared motor and five cells, for which the secret judging awarded him a prize. together with my Catalina, as 'Model of the Meeting', sponsored by Moore Park Model Supplies.

On Saturday night we had a convivial social gathering at the local Oxley Community Hall, followed by some challenging night flying. I flew my six year old son's single channel Coronet, which is older than he is but is still going strong. Ray Pike flew his seven cell glider, displaying the experience necessary to promote such an insane event. Wayne Wilson flew a Domino weighed down with excess gear, and Tony Vella tried his Sequel with flat batteries. Bravest, or craziest, was Cliff Fiddes who managed a loop, to the cheers of the crowd.



David Hobby with the fastest model at the National Rally. About 1 metre span with generous area but very thin aerofoil. Power is a hot Kyosho 240 WS and 7 Sanyo 1200 cells.

Sponsors of the events were generous in their prizes. Additional items came from Eastern Hobbies for second place in Open Duration, and from ABC Models who provided the cyalumes for the Saturday night flying. ABC Models also gave everyone a sample pack of Zap, and Peter Pine gave out beautiful Multiplex calendars.

Next year the event will be up north again to encourage Queenslanders, but Ray Pike plans another Victorian event for Wangaratta at another time for the southerners.

MORE NEW PRODUCTS

Seen at Wangaratta were a few new items worth reporting. Firstly, Steve lees, representing ABC Models, brought along a sleek-looking ARF electric glider which looks great. Constructed substantially of foam, and about 1700 mm span, it seemed to be about right for 7 cell glider competition. Steve was, however, still getting the feel of the new model and could not get it up into the placings. Called the Onair, it should be available soon.

Second new RTF was flown by the Wings 'N' Things team of Chris Hebbard and Gill Evans. This is a new concept in RTFs, not because it is pre-built in conventional balsa, and film covered, but because it is an aileron and V-tail model. Unflown before Wangaratta, it never the less performed well, and surely stands out from the rest. Called the Alto, it is 1850 mm span and may be available soon.



The V-tailed aileron electric model from Wings'N'Things flown at the National Rally by Chris Hebbard. Very distinctive and quite easy to fly, although responses are fast.



The Onair 1700 flown by Steve Lees at Wangaratta Electric Rally. Note all molded components, special aerofoil, good accessibility. A weakness at the tailplane leading edge put Steve out of the contest. Super model. AIRBORNE pic.



Peter Pine with his model for the F3E World Champs. A very clean aircraft. Details are given in the new book, Aeromodelling Digest, edited by the Editor of this magazine. (See advertisement in this issue.)

The best performing of the new gliders, as far as the contest was concerned, was Malcolm Buckmaster's latest development of his Raser. Mal finished a creditable 5th in seven cell with this pretty T-tail glider, powered by the Leisure LT50 motor, on direct drive. The model is similar in size to the Astro Mini Challenger, but better looking. Malcolm built it fairly light, and used either 600 mAh or 900 mAh cells, consequently achieving excellent performance with what is a very good ferrite motor, although well down on the power of the Hectoplet and Astro FAI Cobalts. There is a good chance that this model will be kitted by Pricerite.

While on the subject of Leisure motors, these are now being distributed throughout Australia by Astropower-Leisure Australia. There are two models of the standard 05, buggy size 540 motors. The 05 Stock motor is a plain bearing, shunted brush motor, comparable to a Kyosho AP36. The hotter Modified LT50 motor is ball-raced and should well suit seven cell glider and pylon. There are also two Leisure gearboxes which promise to be both robust and efficient. One is compact, while the other is extended with a long housing and shaft, intended to fit into long pointing glider nose areas.

Other products which I've not mentioned since their release some months ago are the new series of STW controllers and switches using Surface Mount technology. As far as many established flyers all over the world, including Peter Pine and myself, are concerned, STW controllers by Hans Sommerauer are the standard by which all others are judged. Hans now even sells them to Multiplex, who sell them with their own label.

Hans' latest models are much more compact than any previous controller anywhere near this quality. The 20 and 30 Amp versions look like thick credit cards. There are larger 50 and 80 Amp units. Remember these ratings are real, not the mystical figures quoted in hundreds of Amps by Asian and American manufacturers which, if they were true, would be able to melt the puny cables supplied with most of these units. The new STWs maintain all the old features like overload protection, brake, opto-isolation and turn-on glitch prevention. The new relay switches have all the SMT electronics fitting within the size of the relay base, hence they are about half the total size of any other relay switch. Again, all the same features such as brake, isolation and turn-on glitch prevention. Good stuff.

LETTER OF REVIEW

The following is part of a nice letter I received from Barry Payne of Shoalhaven Heads. His comments on the Pricerite Sequel should help those of you interested in a good electric glider for long, lazy flying.

"**Kit: Sequel 2000,** manufactured by Pricerite Engineering. A 2 metre high performance thermal or electric sailplane.

The materials supplied are of first class quality and include just about everything required such as hinges, control horns, push rods and so on.



Phil Stevenson's electric powered Catalina, snapped by Brian Winch at the Sydney Float Fly-In in April. All silver model flew quite well. The date actually coincided with the 39th anniversary of P.G. Taylor's return to Sydney with the Frigate Bird 2, and the model made a flight at 1500 hours as a tribute. Power is two AP 29s with 9 SCR 900 cells to give ROW performance. Taylor's aircraft hangs in the Powerhouse Museum.



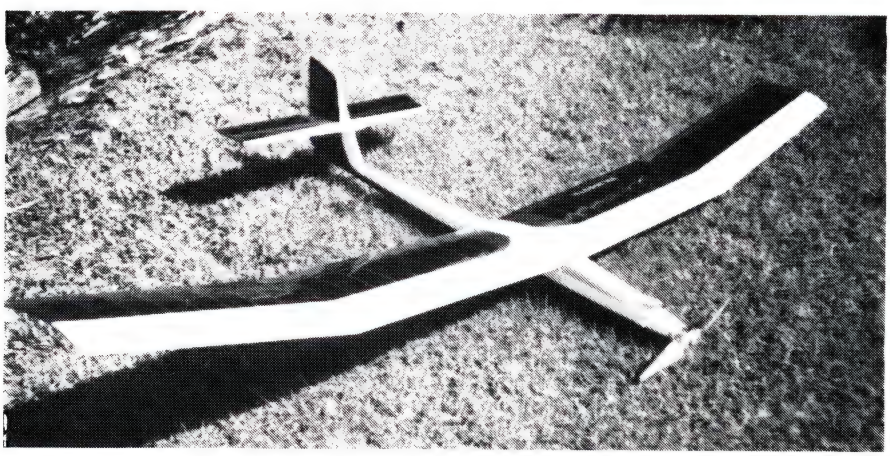
Warren Canning works on his Piper Cub while answering questions at the Dandenong Knox Electric Rally. See table last issue for details. Tanner photo.



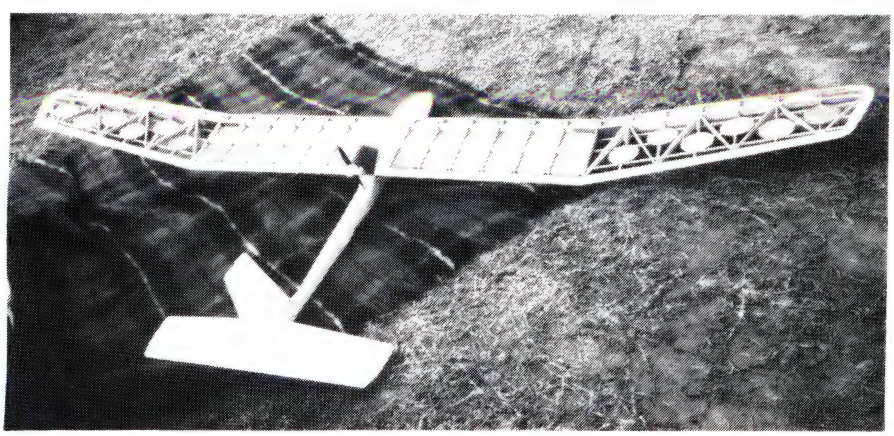
Mike Farnan with the new TRF (Totally Ready to Fly) Aviator electric RC model. The plane is assembled; no sticking or screwing; with three channel radio, motor on/off in flight and BEC receiver already installed. Nicad batteries and charger are included in the box, and the motor is a geared Mabuchi. The Aviator is being imported and distributed by Model Engines to hobby and toy shops. Phone (03) 429 2925 for more details.



At Wangaratta, David Ray with his 7 cell soarer. David provides a service for battery users through DR Power Systems.



Barry Payne's electric version of the Sequel 2000. Very neat in blue and white. Barry's report supports Wayne Hadkins' review in No. 99.



A solar-powered soarer by Reg Register of MARCS in Melbourne. Solar cells provide 6 Amp at 5.6 V, which turns the Mabuchi 380 very enthusiastically. Model weighs 910 gram and has 58.3 sq dm wing area. Some wing covering needed to protect that very expensive array! Photo by the Editor.

Also provided are excellent 4-sheet plans which show two types of tailplane, either all-flying or standard elevator, and the materials are included to build whichever version you feel happier with. Layouts for both thermal and electric versions are also shown. A well laid out construction manual is included, which has 60 photos and half a dozen line drawings to assist building step by step.

Having built this kit previously as a sailplane, I decided to do a few modifications with the electric version. Firstly, I lightened the structure as much as possible without sacrificing strength; i.e. wing ribs, tailplane and top of fuselage. I also put ply sheer webs each side of the wing joiner and carried a single ply web into the next bay before using the balsa ones supplied for the rest of the wing.

The motor I use is a Kyosho AP36 fitted with an Altec 2.5:1 gearbox, the latter obtained from Moore Park Model Supplies. With some dextrous carving of the drilled out nose cone supplied, this unit fits very snugly and is retained by a home-made circular clamp at the rear. Seven 1200 mAh SCR cells drive an 11 x 7 folding Sonic-Tronics prop from Wings'N'Things.

With this set-up, cooling for the motor and batteries is essential. With direct drive I don't think such would be the case. To achieve cooling, cut down plastic teaspoons were made up as air scoops and placed each side of the fuselage, and a larger air intake, cut from the base of a plastic lemonade bottle, in the top of the fuselage behind the wing mounting, also cut from the lemonade bottle.

Total flying weight came out heavier that I'd hoped, considering all the lightening I'd done, at 58 oz! But gearbox, ply here and an extra former or two in the fuselage all add up, so it has a wing loading of approximately 11 oz per sq ft.

From launch it will sustain a 45 degree climb, and goes exactly where I point it. I usually cut the motor after 50 seconds because it's up to about the 500 ft mark. It's fast and responsive, the glide is flat and the ability to make use of light lift does its designer credit. Average flight times are between 15 and 20 minutes using a couple of extra bursts of power. Landing approaches should be low because, as I said, it's fast and just flys on and on and on.

Anyone looking for an electric sailplane that performs could not do much better than the Sequel 2000, either with the set-up I've used or with direct drive. The front has been engineered to accept most electric motors and, what's more, it's Australian made!

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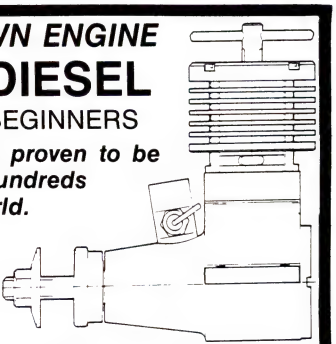
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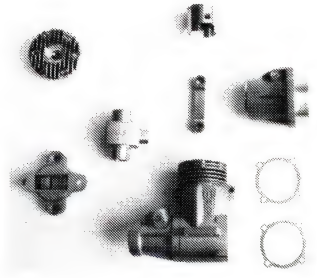
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For Old Timer Sake

by Colin Borthwick



The French family at Canowindra. John with his Cloud Cruiser, team chief, Cathy, and Anthony with his Trenton Terror. Now let's see; who took this? Norm Bell was using his own camera elsewhere at the time. Looks as tho' we have a Phantom of the SAM Champs!

A GOOD SHOW

In such diverse fields of human endeavour as cricket and motor racing, to cite just two, there is a fascination attached to the number 100. The Magic Ton, as it was referred to by the owners of sporty cars capable of this incredible speed, was a matter of pride. As in our national game of cricket, the Ton became the target, if possible before lunch. The very thought of 100 carries an awe usually associated with deeds of daring or patience. On behalf of all Old Timers, I would take this opportunity to congratulate the people behind the Airborne logo on attaining the Ton with this issue. That there were difficult times during the production of the first 100 issues goes without saying. That all the problems were overcome in order to produce Australia's finest aeromodelling magazine is a tribute to the effort and dedication of the people responsible. Long may their efforts continue to bear fruit, on behalf of all modellers. My personal involvement with Airborne is of comparatively short duration; about 20 issues only, but I have in my collection all past issues, and the enhancement of the quality over the last several years is immediately apparent. Let us all hope, for the overall good of our hobby in Australia and New Zealand, that this trend continues. Thank you Airborne; long may the postman deliver.

OVERSEAS RECRUIT

The last month or two have been rather busy for me. What with flying Tomboys (more of that later) and Hangar Rats, and preparing for and attending the SAM Australia Championships at Canowindra over Easter, I have hardly had time to entertain my guest, Eut Tileston. Still, he doesn't complain too much; he just sits and cuts, Zaps and sands. That man can generate more balsa dust in a given time than any other builder I know. Must account for the terrific finish he attains. The guy is an amazing builder, always striving to use less material of a lighter nature in the firm belief that "everything weighs something and some things weigh too much. No matter what you fly, it will perform better if it weighs less." Eut is a firm adherent to the dictum that you do less damage when a light model eventually meets its maker in a CKD condition than would be the case with a heavier structure. What amazes me is his ability to build almost everything 'in the air', and not pinned down as we mere mortals do. He is a 100% convert to Zap, and this makes his building techniques possible. Trying to hold a structure true while waiting for balsa cement or PVA glues to dry would be out of the question. As for his technique with a Monocote iron; I just sit open-mouthed in wonderment. His only failing is his alleged inability to drive on the 'wrong side of the road'. I am sure that he is just playing it smart and letting us do the driving while he surveys the country. There was plenty of time for that preoccupation during out 14 hour, each way, drive to the SAM Champs. You can take the boy out of the country, but you cannot take the country out of the boy. Eut grew up on a ranch in Colorado, so he knows a thing or two about the country and, like most country boys, is not overly impressed by the cities. Still, that is where the hobby shops abound, so he now is resident in the Sacramento area of California, where hobby shops really do abound; take my word for it! We will miss him when he flys home.

THE 1990 SAM CHAMPS

If asked for my impressions of the SAM Champs held at Canowindra over the Easter weekend, I would say - FUN, companionship, rain, FUN, the clatter of a diesel for almost 30 hours, FUN, pushing said diesel powered devise, or in my case steering while others pushed,



The Manwarrings at Canowindra. From gliders to a Lanzo Record Breaker. Wellies were all the fashion! They enjoyed the weekend tho'! J.F. photo.



Barry Dent prepares his Kerswap for a confrontation with the competition at Canowindra. Brad Turner (Yes! that's Brad!) stands nonchalantly by with the stopwatch. J.F. again.

Doolings and Mac 60s clawing their way to around 1800 feet in 35 to 40 seconds, the odd odours of fuels, FUN, laughing until I thought I would break a rib, personally flying badly, FUN and mud, or as the French would say, "Merde!" Overall I can say that the 1990 SAM Champs were just plain old FUN. They were, as someone once said many years ago, almost biblical. The return of the FUN of a few years ago reminded me of the phrase - "As it was in the beginning, is now and (hopefully) ever shall be".

We arrived in Canowindra at 1.30 on the morning of Good Friday, in a condition that can only be described as tired but happy. The Budget Mobile Home had performed well on the way south, but something over 1100 kilometres in a large diesel powered device is a touch tiring. We parked, perhaps moored would be a better word as it was raining when we arrived, at the showgrounds, ready for processing, due to begin in a few hours. The four of us; Barry Dent, Alan Mowat, Eut Tileston and I; had no troubles, and our models were duly passed as kosher.

A quick breakfast and then out to the field for some, in my case much needed, practice. My little K&B powered Lancer had had only three flights prior to leaving Brisbane and was still beating me two to one! It accelerates faster than anything ever flown before, and it is difficult for these old reflexes to keep ahead of it, or even up with it, in the vertical climb. We all got in some flights and drove back to beautiful downtown Canowindra to help out in an engine rebuilding session on John French's Enya 46. This was interrupted by the appearance of such 'helpers' as Graham Sinclair, Norm Bell, Ian White and numerous other comedians who kept us entertained, not to mention distracted, during the most critical parts of the delicate surgery on the 46 FS. Norm, admittedly after some persuasion, fired up his O&R 60. I have never seen an hotel cleared out so fast! Glad it was Good Friday, or there might have been a real panic.

We missed the control line rally, which was proceeding at the same time as the Great Engine Rebuild, and I regret that we did not see any Ukies flying during the weekend. Apologies to John Abbott and the band of circular enthusiasts who always have FUN. I merely get dizzy these days. Maybe I need longer lines! After a very good, as usual, Chinese meal at the golf club, we drove down to the Annual General Meeting, after coping with a recalcitrant starter on the mobile home. The AGM, ably chaired by SAM 1788 President, Mike Pettigrew, was told of an investigation into the suitability of the nearby larger town of Forbes for future SAM Champs. The meeting voted that the committee should check into all aspects of the suitability of the two venues. I believe that, all things considered, Forbes would be a better location, having much more accommodation available. The fact the it is a few kms closer to Brisbane has nothing to do with my preference! Of course, as I mentioned at the meeting, the best flying field in Australia is still available at Amberley AFB. Food for thought! After a little more pushing we arrived 'home' at the showground. I was asleep before I had turned the ignition off.



When John French asks Basil Healy to look happy, there has to be a good reason! At Canowindra it was Basil's replica of the Boehle Giant, probably the biggest Old Timer ever! The engine is a re-engineered Webra 61, but John didn't ask for more details, such as the acreage of the covering and how to gain access to a balsa plantation, in case they took up too much space! If some pilots can fly a Playboy at 3,000 ft, this one ought to be quite a rainmaker!

Saturday did not dawn. It was raining so hard that we had serious thoughts of using our onboard toilet, at a cost of $75 for cleaning dues. However, we all made a dash for "it" in the showground and got drenched for our trouble. Maybe that $75 was worth it! We will never know. After breakfast we drove out to the field and spent the morning making coffee for all the homeless modellers who "just dropped by while I was in the neighbourhood." We also did some major surgery on Eut's beautiful big red Lancer to allow more throttle movement. Have you ever made a servo horn out of ply? Around mid-day the rain cleared and **Texaco** was called. As the entrance to the field was, by then, a sea of mud due to some enthusiastic rally-style driving on the part of some competitors who did not fancy the walk, we carried everything in. I was in one of my lazier moods and did not think that all this walking was my style, so I left the ol Lanzo in the Budget Mobile. Dent made the comment that only Borthwick would bring the biggest, most cumbersome model and then leave it in the bus. Sorry guys. When I found that only three rounds were to be flown I almost changed my mind, but the mud kept me honest. One advantage of not competing, probably the only advantage, is that you can wander around and see what is happening. Bruce Knight was flying his beautifully built Lanzo Bomber to good effect, despite the shirts that Eut and I were wearing that proclaimed that we would rather eat worms than fly a Bomber.



The Boundies at Canowindra; Simon and Trevor with their Miss Americas, ... er ... Misses America. Popular aeroplane and popular people posing for John French.



Bruce Abell's Goss wing from Eut Tileston's plan. Power supplied by an O & R 60. Manages 7,500 rpm on a 14 x 6. Not bad by any standards! Abell photo via Borthwick.

I believe that Bruce is one of the most meticulous builders I have seen, and that he deserves his success. I was, however, careful not to stand in his propwash, as one sniff of that fuel was enough for me. How far do you live from Lucas Heights, Bruce?

Easter 1990 had the introduction, as an experiment, of two classes of Texaco. There were 35 entries in conventional Texaco and 32 in 'Standard Fuel Texaco'. An interesting aside is that, of the 35 entrants in Texaco, 2 did not fly, 2 received zero points and only 5 entrants failed to qualify for the fly-off. In Standard Fuel Texaco, out of the 32 entrants, 9 did not fly and 13 did not make the fly-off, leaving 10 flyers who actually flew in the competition. In both events it appears that the landing circus only claimed three flyers, thereby keeping them from the fly-off. Much food for thought here, methinks. Congratulations to Bruce Knight for taking the top place in Texaco and to another visiting American, Dennis King, for taking the marbles in Standard Fuel.

Saturday night was yet another Chinese meal and then on to the school gym for a touch of indoor flying. As the current world speed record holder for Hangar Rats, 103 kph, in the mobile home, I was expecting some good flights! What I did not know was that some low person, who shall remain nameless, had sat on my model. Yet another rebuilt which took about five minutes and used up a lot of Alan Pearson's cyano, and the stealth rat was flying again. Thanks Alan; your Zap's worth bottling! Mr. Hangar Rat himself, Max Starick, showed us all up with a model that was so light that he had to weight it to stop it from flying away unwound. The Shaw family were foolish enough to back the Goulburn contingent against the Brisbane boys. I will be down to collect our winnings one day guys, so look out! It is a great sight to see the Shaws (especially Pamela), as they illustrate the old maxim that the "family that plays together stays together". After another session of pushing the bus, we decided that it was time to see what was wrong with it. We, I use the word loosely, as I sat in the cabin ready to do the hard work of turning the key when requested, hit, poked, swore, pulled and eventually read the instructions. These told us nothing so we pulled, swore, poked and hit a little more until I made one of my famous management decisions and turned the key. The thing started and did not let us down again. As I explained to the doubters who had crawled under and over it, there is a correct time to try everything. You just have to have the right knack of turning the key. Still a little sceptical, we drove out to the field, parked and turned in.

After all the excitement of flying indoors, we woke on Sunday morning, breakfasted on hot cross buns, and prepared to sally forth across the mud to compete in **Duration.** For those of you who have never witnesseda full-blooded Duration model climbing out, let me say that you have missed one of the really amazing sights and sounds of our hobby. Between 20 & 40 seconds of adrenalin pumping action, trying to keep the device under control and in the portion of the sky where you want it to be, then a transition to the glide, which seems to demand more fingers and thought than I sometimes possess, followed by the perfect glide, hopefully into lift. Of course, if you fly up into lift under power the whole game changes, usually in your favour!

There were 68 entrants in Duration this year; a record I'm sure. Of that figure all but 6 flyers posted scores, and there were 35 modellers in the fly-off. There were 13 McCoy 60 or Dooling 61 powered models in the fly-off; over one third of the total. More food for thought. Over half the total number of entrants were in the fly-off and over one third of these were using models powered by antique engines with a 35 or 40 second engine run. Small wonder that one or two of the models, carrying a baragraph watch, recorded around 1800 feet in their allocated engine runs! The flyer who got up fastest and highest, and stayed up longest, was Andrew Kennedy from Melbourne flying a Glo McCoy powered Playboy. I might just have to get another T shirt made for Playboys! Well done, Andrew, your model flew flawlessly and you deserved your win.

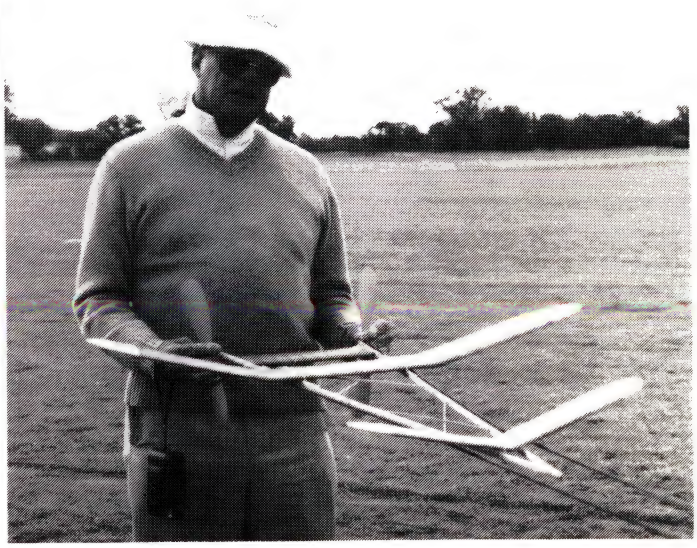
Duration was followed by **½A Texaco** with 16 entries (all using Cox reed-valve engines). See how simple this event is, whether you are a competitor or the CD. ½A is the KISS principle exemplified. All the tried and noted flyers had come down for the event and it was left to Tom Prosser to take out first in a fly-off from Todd McGuffin and Peter Werczyk. Eut Tileston was the best performing mobile home passenger, flying his highly unusual Gross Wing. Those who have seen this model fly will know what a performer it is. However, Eut is slowly coming to grips with the Coriolis effect, and will have the thermalling techniques for the northern hemisphere out of his head and be ready to thermal down under when next he visits us.



Derry Brown and a design he flew in contests more than 30 years ago. He has not lost the touch of a master stunter, says cameraman French.



John Quigley and the cabin version of the MG. Not as well known as the version with the wire wing mount. Surprised some of the flyers at Canowindra, reports photographer J. French.



Dennis Parker acts as anchor-person for the interesting task of winding the motors of a twin pusher. Note camera on wrist, ready at hand to get shots of the action to follow. John French had his camera handy for this pic.

There were many innovations at Canowindra this year, including an event for **Vintage Glider,** won by a Thunderking, flying Leo O'Reilly. This is a BIG model. The **Twin Pusher** event attracted four entries for a mass launch. Last one down was Max Starick, from Marcus Peake, Basil Healey and Vic Clarke. Well done Max! I would have thought that Basil's height would have given him an advantage in this event.

Last event to be flown was **2 cc.** 18 flyers got to fly, and Harold Stevenson, flying his Gas Bird, was the winner. No fly-off was required, Harold winning by a 26 second margin. I was surprised that there was such a comparatively small entry for what I had gathered was a popular event. Maybe the simplicity of ½A is the attraction.

Congratulations and thanks, on behalf of the juniors, to Model Flight for their generous donation of an engine to each of the five youngsters. Todd McGuffin took out the overall junior award from Simon Boundy. Well done Todd; we old guys look to you youngsters to keep the SAM movement going in the years to come. There was not one junior at the SAM NA Champs at Jean, Nevada, last year!

So ended the SAM Australia Champs for 1990. As we drove back to Brisbane through rain, fog and exhaustion, there were the usual post mortems. We deep northerners and one Californian all declared that we had had a tremendous weekend. The spirit in which the contest was conducted was like the "good old days", and for this we said thanks to Mike Pettigrew and his committee. You all did a great job fellers. Long may this type of competition be the order of the day. No protests; no bad tempers; just lots of good old FUN.

There were several questions that came to mind on the drive north, to which there will be answers eventually. Questions such as:
- Why go to the bother of processing models and then let the flyers fuel their Texaco models without supervision? We are, for the most part, Gentlemen (and Ladies) and play by the rules.
- Why did we see so many models, bearing a Processed 1990 sticker, with wheels which were way under size?
- Why insist on all models landing in a circle? Perusal of the results shows that the circle did virtually nothing to keep the fly-offs down to a manageable size. I saw two flyers almost hit by incoming models, and one land on top of another. It seems that all the circle does is to start arguments and spoil the FUN.
- Above all, why do we fly five rounds in both Texaco and Duration in order to qualify for the real event - the fly-off? All we are doing is flying the same event twice with two different models. Perhaps all these questions should be given some thought before the next BIG FUN ONE in 1991.

TOMBOY TRIALS

SAM 84, the Vintagents, held their first Tomboy day at Cow Pat Field the week before Canowindra. Twelve models were flown and sixteen modellers attended. I had flown my Tomboy into the Brisbane River the previous day, so I was there in a sulk. Anthony French, ex junior, took out first place, and his father, Old John, was a close second. Col Somers had the longest flight of the day and was awarded the Red Eut by the Californian Condor himself. This type of one-design contest could just be another facet of the OT hobby waiting in the wings, so to speak! Next time I will be pushing for anything but a Tomboy, as I still have fond memories of all the lightweight gear, receiver, servos and so on at the bottom of the river. I did make friends with a dog and got zapped by an electric fence during my efforts to retrieve the thing, but they are other storis. I am getting too old for this type of thing. The first prize, a Super Balsa Stripper, was donated by Warwick Williams of Southside Hobbies. Thanks Warwick for your assistance.

This issue, for your gratification, I offer Horner's Five-Thumb Postulate: "Experience varies directy with equipment ruined".

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Colin Borthwick,
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W.A. STATE CHAMPS; 20 May 1990

Duration - 10 flyers

1. Paul Baartz	Playboy	McCoy 60		1097
2. Roger Briegal	Playboy	OS 61 FS		965
3. Graeme Sharp	Dallaire	OS 40 FS		882

Texaco - 12 flyers

1. Paul Baartz	Lanzo Bomber	OS 60 FS		1678
2. Roger Briegel	Commodore	OS 40 FS		1629
3. Dick Gibbs	Red Zephyr	OS 40 FS		1438

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RESULTS

Texaco

Bruce Knight	Lanzo Bomber	Enya 60 FS Glow	1240 +	1169
John Quigley	MG Cabin	OS 60 FS Glow	1240 +	1014
Steve Weissner	Flamingo	OS 61 FS Spark	1240 + 826	
Keith Eyles	Dallaire	Enya 46 FS Glow	1240 +	812

Standard Fuel Texaco

Dennis King	Powerhouse	Anderson Spitfire	1240 +	559
Rex Brown	MG2	Enya 46 FS	1240 +	538
Leo O'Reilly	Record Breaker	Enya 60 FS	1240 +	532
Alan Mowat	Lanzo Bomber	Enya 60 FS	1240 +	455

Duration

Andrew Kennedy	Playboy	McCoy 60 TS Glow	1280 +	1477
Craig Thornton	Pylon b	McCoy 60 TS Glow	1280 +	1291
Don Southwell	Playboy 92%	OS 32 TS	1280 +	1120
Leo O'Reilly	Vespa	Enya 45CX TS	1280 +	1065

2 cc

Harold Stevenson	Gas Bird	Enya CX11 TS	2520
Peter Tilley	Dallaire 50%	Taipan 1.5 Diesel	2492
Tom Watson	Buzzard B'shell	MVVS 2 cc Diesel	2479
David Foster	Dallaire 50%	PAW 1.49 Diesel	2473

½A

Tom Prosser	Coronet	Cox	1860 +	895
Todd McGuffin *	Kerswap	Cox	1860 +	656
Peter Werczyk	MG	Cox	1860 +	629
John Abbott	Playboy 65%	Cox	1773	

Vintage Glider (RC)

Leo O'Reilly	Thunderking	1948	1440
Jeo McGuffin	Thermic 100	1937	1014
Vic Clarke	Frog Prince	1949	785
Trevor Boundy	Evander	1946	674



The new FOTS threat for Duration on the '90s. The model is a 78 inch span Bunch Scorpion Major powered with a Saito FS65. A joint Tileston (90%) and Borthwick (10%) venture. I also made the coffee! Borthwick pic.

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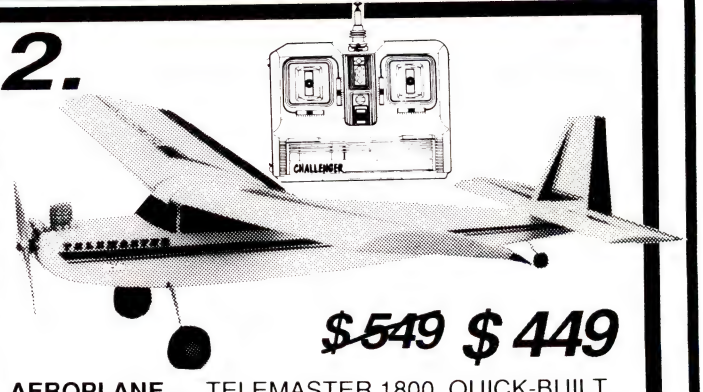
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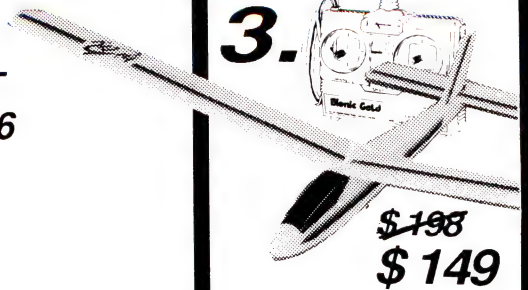
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Hollow F/Glass Aerial w/mount	$24.50	**$22.50**
Replacement Aerial Tube	$2.50	**$1.50**
Magnetic Parts Box	$6.95	**$5.95**

HEATSHRINK 2m L Red/Black/Yellow/White/Clear

35mm W	$4.95	**$3.95**
65mm W	$6.95	**$5.95**
35mm W	$6.95	**$5.95**
75mm W	$7.95	**$5.95**
Small Servo Wire Heatshrink — 2.5mm ID (PK 1m)	$4.95	**$3.95**

SULLIVAN FUEL TANKS STD/FLEX ALL SIZES 10 per cent OFF MARKED PRICE

METRIC & IMPERIAL BRASS/ALUMINIUM/STEEL TUBING & WIRE 10 per cent OFF MARKED PRICE

METRIC & IMPERIAL THREADED ROAD ALSO 10 per cent OFF

Pushrods 125cm Long (pair)	$8.50	**$7.50**
Pushrods 100cm Long (pair) w/clevises	$12.50	**$10.50**
Pushrod Boot Seals assy (pair)	$8.50	**$7.50**
Pushrod Boot Seals only (pair)	$6.50	**$5.50**
Kwik Filler	$32.50	**$24.50**
Kwik Filler Probes	$3.50	**$2.50**
Pressure Nipple 3mm Thread 3mm ID	$3.50	**$2.50**

METRIC & IMPERIAL FASTENERS HUGE RANGE FROM 2MM, 1/16 AND UP 10 PER CENT OFF MARKED PRICES

Deans Connectors (pair 20) amp cap	$5.95	**$4.95**
Power Pole connectors (each) 30 amp cap	$1.95	**$1.45**
Bullet Connectors (pack of 10) 20 amp cap	$3.95	**$2.95**
Waterproof Whip Aerial Rx	$14.50	**$12.95**
Deans Tuned Rx Aerial 2/Choke	$22.50	**$18.50**
Replacement Aerial only	$10.50	**$9.50**
Solarfilm (all colours)	$10.50	**$9.50**
Solartex (all colours)	$22.50	**$19.50**
Solartrim (all colours)	$9.50	**$7.95**
Silkspan	$2.25	**$1.95**
Econocote	$14.95	**$12.95**
Double Sided Tape Sheet	$3.95	**$2.95**
Double Sided Tape Roll	$9.95	**$7.95**
Cable Ties 2.5 x 200mm Long (pack of 100)	$12.95	**$10.50**
Kydex Sheet 150 x 300mm Black	$16.50	**$10.50**

PLYWOOD SHEET Marine Ply 300 x 1000mm

.6mm	$16.50	**$14.50**	2.0mm	$12.50	**$10.50**
.8mm	$16.50	**$14.50**	2.5mm	$12.50	**$10.50**
1.0mm	$14.50	**$12.50**	3.0mm	$12.50	**$10.50**
1.5mm	$14.50	**$12.50**	4.0mm	$12.50	**$10.50**

PLYWOOD SHEET Marine Ply 300 x 300mm

3.0mm	$3.95	**$3.25**	4.0mm	$3.95	**$3.25**
Stainless Steel Sheet 300 x 300mm 1.0	$6.50	**$4.50**	Ball Links 3mm w/Balls per 10	$8.95	**$7.95**
4mm w/Balls pair	$3.95	**$3.25**			
Deluxe Fuel Filter	$5.50	**$4.50**			
Deluxe Fuel Filter w/Tap	$12.50	**$10.50**			
Crap Trap	$4.50	**$3.95**			
Lead Balancing Tape (per foot)	$2.50	**$1.80**			
Lead Sheet	$4.50	**$3.50**			
Stainless Steel Screen Mesh 250 x 350mm	$6.50	**$5.50**			

PLASTRUCT TUBING, ANGLE H FRAME, T SECTION ETC 10 PER CENT REDUCED

TOOLS

Screwdriver Phillips No 1 100mm L	$2.95	**$1.95**
Screwdriver Phillips No 2 150mm L	$7.50	**$6.50**
Flat Blade No 1 100mm L	$2.95	**$1.95**
Steel Rule 300mm	$12.95	**$9.95**
Steel Rule 150mm	$7.50	**$6.50**
Long Nose Pliers 200mm	$9.95	**$8.95**
Diagonal Cutters 150mm Hardened Jaws	$8.95	**$7.95**
Electronic Pliers 115mm	$12.50	**$10.50**
Quick Snip Sheet Metal Cutter	$4.95	**$2.95**
Jewellers Screwdriver Set	$5.95	**$4.95**
Open End/Ring Spanner 5.5 & 7mm	$6.50	**$4.95**
Needle File Set (set of 10 files)	$8.95	**$7.95**
Woodworking Scriber	$5.95	**$4.95**
Pocket Scribe	$5.95	**$4.95**
Double Ended Scribe	$9.50	**$8.50**
Pinvice 0.8-1.5mm	$7.95	**$6.95**
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Pinvice 3.0-4.8mm	$8.95	**$7.95**

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5.5mm	$9.95	**$8.50**	8.0mm	$9.95	**$7.50**
7.0mm	$9.95	**$7.50**	9.0mm	$9.95	**$7.50**

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Magnetic ¼ Drive Hex T/Bar Driver Set	$24.95	**$19.95**
7 Piece Nut Drive Set (metric/imp.)	$24.95	**$19.95**
Long Reach Precision Screwdrivers (set of 3)	$14.50	**$7.95**
Pro Edge X-Acto Combination Knife Blade Set (w/case & 13 blades)	$29.50	**$22.50**
Pro Edge X-Acto No 1 Knife	$2.95	**$2.25**
Replacement Blades No 1 (pack of 5)	$2.95	**$2.25**
Pro Edge X-Acto No 5 Knife w/Chuck	$7.95	**$5.95**
Replacement Blades No 2 (pack of 5)	$2.95	**$2.25**
Genuine Stanley Knife Blades (pack of 5)	$2.95	**$2.25**
Snap Blade Trimming Knife (12.5mm black)	$1.95	**$1.25**
Replacement Blades (pack of 10)	$3.95	**$2.95**
Utility Knife (20mm blade)	$1.95	**$1.25**
Straight Cut Tinsnips 200mm	$12.95	**$5.50**
Straight Cut Tinsnips 250mm	$12.95	**$6.50**
3 Piece C Clamp Set	$12.95	**$5.95**
Coping Saw (steel frame/wooden handle) 200mm	$7.95	**$4.95**
Replacement Blades (pack of 10)	$3.95	**$3.50**
Hi Quality Replacement Blades (pack of 16)	$12.95	**$5.95**
Xtra Fine	$7.95	**$6.95**
Medium	$7.95	**$6.95**
Fine	$7.95	**$6.95**
Wood Carving Set (7 piece)	$18.50	**$16.50**
Hacksaw (steel frame & handle) 180mm	$5.95	**$4.95**
Replacement Hacksaw Blades (pack of 10)	$4.95	**$3.95**
Paasche Type H Series Airbrush w/Propellant	$49.95	**$29.95**
Portable Parts Washer 6v or 7.2v	$59.95	**$49.95**
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Bearing Cleaner Module	$38.50	**$29.95**
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Mini Surface Ground Vee Block	$36.50	**$19.95**
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Resharpen all your X-Acto Blades

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UFO Slow		**$12.95**
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CRC Silicon Spray Lube 500gms	$8.95	**$6.95**
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CRC Lectra Clean Aerosol 500gms	$10.50	**$9.50**
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Castrol M Methanol Fuel Lubricant Castor 1 litre	$12.50	**$10.50**
Castrol M Methanol Fuel Lubricant Castor 4 litre	$36.50	**$28.50**

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Flying Model Helicopters, by David Day	$29.95	

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w/Screens & Fasteners Yellow/Orange/White

20 size	$64.50	**$58.50**
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Augusta 109A 50/60 size	$325.00	**$295.00**
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Jetranger 20/35 size	$275.00	**$225.00**
Squirrel (Ecuriel) 20/35 size	$275.00	**$225.00**

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Concept MRB Wooden Weighted 50/60 MRB Wooden Weighted	$39.50	**$29.50**
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Ultralight Nyloc 3mm (pkt 10)	$4.50	**$3.95**
Ultralight Nyloc 4mm (pkt10)	$4.50	**$3.95**
Stainless Steel Screen Mesh 250 x 300mm	$6.50	**$5.50**

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#4007 Times Brushes pair	$9.50	**$7.50**
#4035 Cut Brushes Offroad	$9.50	**$7.50**
#4038 New Hard Brushes	$8.50	**$6.95**
#4103 Dual Slotted Brushes	$8.50	**$7.50**
#4033 Heavy Motor Springs pair	$3.95	**$2.95**
#4032 Light Motor Springs pair	$3.95	**$2.95**
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#4016 Endbell Composite	$39.50	**$35.50**
#4018 Endbell Aluminium	$44.50	**$39.40**
#4041 Wet Magnet Can	$39.50	**$36.50**
#4030 Bearing Setting Tool	$9.50	**$6.95**
#4027 Steel Motor Shims	$26.50	**$22.50**
#4044 Timing Ring and Screws	$3.50	**$2.95**
#4060 Commutator Cleaning Stick	$4.50	**$3.50**
#4061 Commutator Polishing Stick	$10.50	**$7.50**
#4036 Foam Motor Dust cover	$3.95	**$2.95**
#7039 Silicon Shock Seals	$3.95	**$2.95**
#4103 Dual Slotted Brushes for High Amp Draw		

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#1706 15 Turn Double Wind	**$129.50**
#1707 16 Turn Double Wind	**$129.50**
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#1710 19 Turn Double Wind	**$129.50**
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#003 18 Turn Double	**$59.95**

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#3010 13T DOUBLE FOR #1704	$56.50	**$49.50**
#3009 14T DOUBLE FOR #1705	$56.50	**$49.50**
#3006 15T DOUBLE FOR #1706	$56.50	**$49.50**
#3014 16T DOUBLE FOR #1707	$56.50	**$49.50**
#3016 17T DOUBLE	$56.50	**$49.50**
#3008 18T DOUBLE FOR #1709	$56.50	**$49.50**
#3007 19T DOUBLE FOR #1710	$56.50	**$49.50**
#3031 20T DOUBLE FOR #1711	$56.50	**$49.50**
#3032 13T TRIPLE	$56.50	**$49.50**
#3033 14T TRIPLE	$56.50	**$49.50**
#3034 15T TRIPLE	$56.50	**$49.50**
#3035 16T TRIPLE	$56.50	**$49.50**
#3036 17T TRIPLE	$56.50	**$49.50**
#3037 14T QUAD	$56.50	**$49.50**
#3038 15T QUAD	$56.50	**$49.50**
#3039 16T QUAD	$56.50	**$49.50**
#3040 13T Single	$56.50	**$49.50**

MOTOR ACCESSORIES	RRP	SALE
#4006 CUT BRUSHES pair	$9.50	**$6.95**
#4007 TIMED BRUSHES pair	$9.50	**$7.50**
#4035 CUT BRUSHES OFFROAD pair	$9.50	**$7.50**
#4038 NEW HARD BRUSHES pair	$8.50	**$6.95**
#4033 HEAVY MOTOR SPRINGS pair	$3.95	**$2.95**
#4032 LIGHT MOTOR SPRINGS pair	$3.95	**$2.95**
#4028 MEDIUM MOTOR SPRINGS pair	$3.95	**$2.95**
#4016 ENDBELL COMPOSITE	$39.50	**$35.50**
#4018 ENDBELL ALUMINIUM	$44.50	**$39.50**
#4041 WET MAGNET CAN	$39.50	**$36.50**
#4030 BEARING SETTING TOOL	$26.50	**$22.50**
#4027 STEEL MOTOR SHIMS	$3.50	**$2.95**
#4044 TIMING RING AND SCREWS	$4.50	**$3.50**
#4060 COMMUTATOR CLEANING STICK	$10.50	**$7.50**
#4061 COMMUTATOR POLISHING STICK	$10.50	**$7.50**
#4036 FOAM MOTOR DUST COVER	$3.95	**$2.95**
#7039 SILICONE SHOCK SEALS	$3.95	**$2.95**
#4103 Dual Slotted Brushes	$8.50	**$7.50**

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51T Tasco 75 Power w/Tripod	$109.50	**$96.50**
51TR Tasco 75 x 50 x 117 w/Tripod	$109.50	**$96.50**
53T Tasco 40 x 40 w/Tripod	$79.50	**$69.50**
44TR Tasco 30 x 90 x 60 w/Tripod	$295.00	**$245.00**

MICROSCOPES

M900ZF 5 Way Microscope 900x Illuminated	$129.50	**$109.50**
P100 Basic Microscope 100x	$19.50	**$16.50**
Slide Making Kits w/Specimens	$28.50	**$24.50**

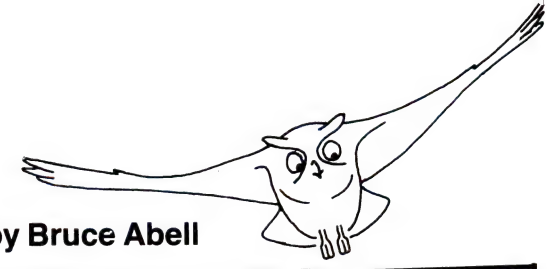
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ON SILENT WINGS



by Bruce Abell

SPARRING WITH STRENGTH

In the October 1989 issue of RC Soaring Digest was a short article on measurements of the spar strength for different arrangements of spars composed of spruce, balsa and carbon (CRE) strips. Details are shown in the diagrams and table. The author, Bob Bayard, gave the following summary.

"The very best design, considering overall strength for a given weight and ease of construction, seems to be a full width balsa shear web supporting pure carbon fibre laminates, with three times as much carbon fibre on the compression cap as on the tension cap. A similar spar but with a thinner horizontal grain spruce shear web is equally good. Mixed spruce and carbon fibre caps are pretty good, and binding with thread doesn't add much, if any, strength to an alrteady good design. Using carbon fibre you can make a wing weighing the same as one with a conventional spruce cap, balsa shear web spar, but about three times as strong.

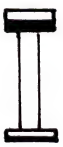
In our study we have tried to find the best combination of carbon fibre, spruce and balsa for making light, strong wings. This task, however, is a difficult and complex one and clearly we haven't exhausted the subject. There are many things unexplored; for example: the effect of sheathing on a built-up wing, a more thoroughgoing study of the shear web question, and the whole question of how to best use carbon fibre in foam core wings. However, the results reported here will permit modellers to drastically reduce weight and/or increase strength of model wings."

SPAR CONFIGURATIONS
Dimensions in mm
Weight in gr/m
Spars shown actual size
Stress at failure kg
Adhesive: thick cyano



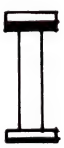
10.1 x 3.1 Spruce
3.1 Balsa
8.7 x 3.1 Spruce

30.5 gr/m
11.7 kg



6.3 x 1.5 Spruce
6.3 x 0.9 CRE
3.1 Spruce
6.3 x 1.5 Spruce
6.3 x 0.35 CRE

30.5 gr/m
31.7 kg



6.3 x 1.5 Spruce
6.3 x 0.9 CRE
3.1 Balsa
6.3 x 1.5 Spruce
6.3 x .35 CRE

24.6 gr/m
26.2 kg



5.1 x 1.6 CRE
3.1 Spruce
5.1 x 0.53 CRE

30.5 gr/m
31.2 kg



6.3 x 2 CRE
3.1 Balsa
6.3 x 0.8 CRE

30.5 gr/m
36.2 kg

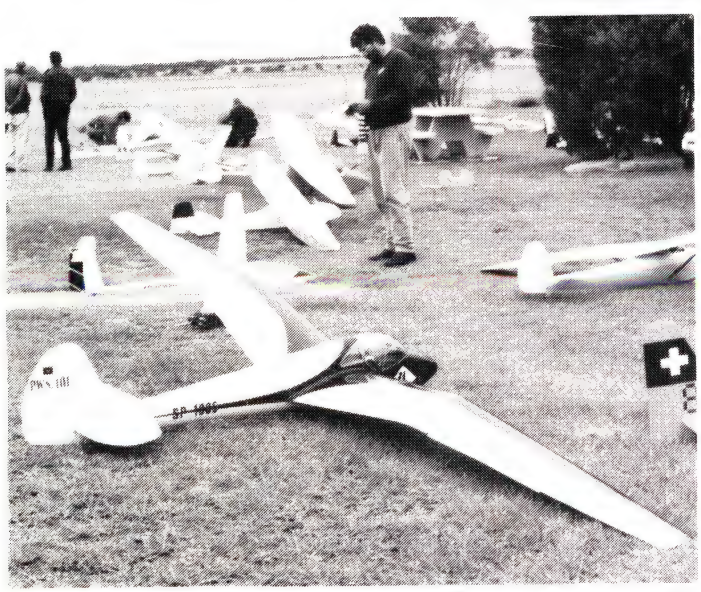
Significant findings:

* Spar flanges were stronger in tension than in compression.
* CRE was glued between top flange and web.
* CRE was 4.5 times stronger than spruce.
* CRE at 1.5 mm would not buckle.
* Vertical grain webs were 25% stronger than horizontal grain webs.

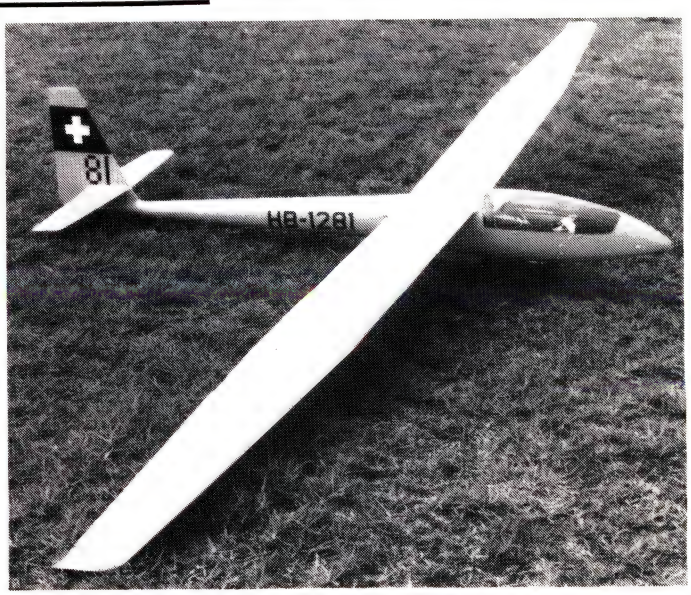
NOTE: CRE has very poor compresion strength, compared to its tensile strength, which may be compensated with S-glass.

THE SCHUEMANN WING

Research into wing efficiency has been most intense with sailplanes because of gains in performance, and also with RPT aircraft because of reduction in operating costs. In the late 1970s an American glider pilot, Will Schuemann, was disappointed with the low speed performance of his ASW 12, and began to investigate the problem. With wool tufts and wind tunnel tests, he found that the airflow over the tip was angled towards the wing root, as would be expected from the influence of the tip vortex, but there was also separation of the top surface flow at the trailing edge, and that the separation could travel towards the wing root causing loss of lift and much drag. Actual measurement of the pressure gradient showed that a separation bubble devel-

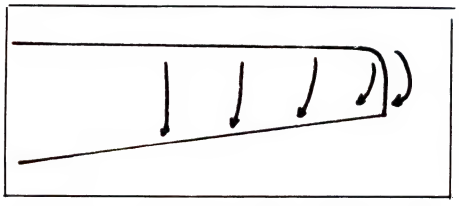


Martin Simons' PW5 101, winner of the before fibreglass section of the Scale Glider Rally at Waikerie in April. Topped the static score and was second in the flying.

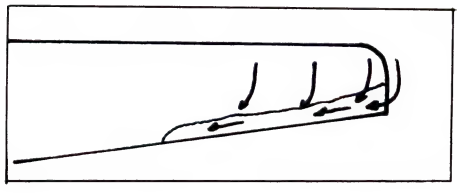


The Elfe S4 by John Gottschalk, overall winner of Class 2 at the Waikerie Glider Rally. Weather was fair, considering the flooding down the eastern side of the continent at the same time.

oped and that the wing tip vortex could pump air into the tube-like bubble along the trailing edge, pushing it to the wing root. The worst case was separation along the entire wing.

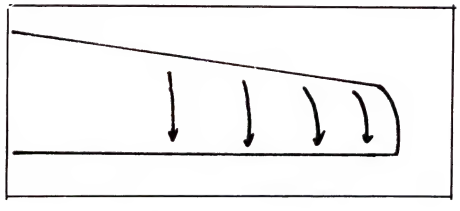


Airflow over wing tip with swept forward trailing edge.



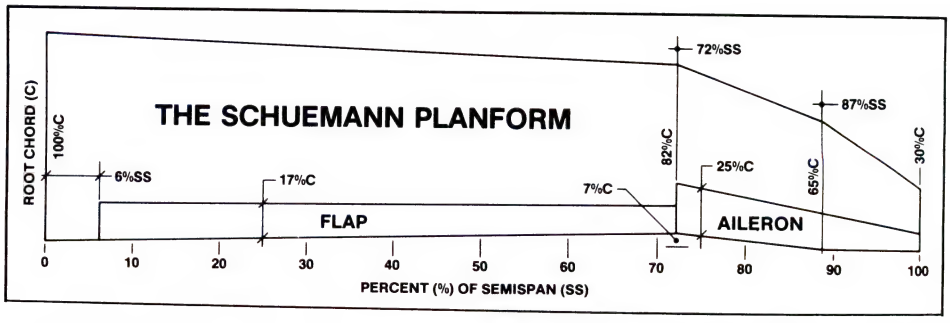
Development of trailing edge separation.

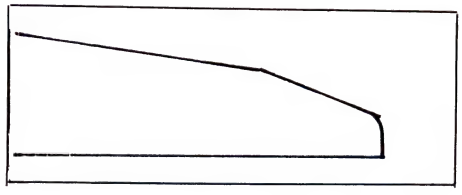
By sweeping back the leading edge, and making the trailing edge straight; i.e. perpendicular to the fuselage centre line, the adverse pressure gradient was greatly reduced. And by reducing the wing tip chord, the tip vortex was reduced and its detrimental effect was cancelled.



Airflow over wing tip with straight trailing edge and swept back leading edge.

The wing tip planform resulting from these two developments had double taper on the leading edge. Schuemann also had to take into account the flap and aileron on a high aspect ratio wing. The dimensions of the original design he developed are shown in the diagram, taken from Model Builder, December 1989, with permission.





Double-taper on wing tip plan form.

Schuemann modified his ASW 12 with good results, and Klaus Holighaus, designer for Schempp-Hirth, used the design for the Discus sailplane. However, the design work was done for an Re of about 1.2 million. Would it work at 0.1 million for model sailplanes?

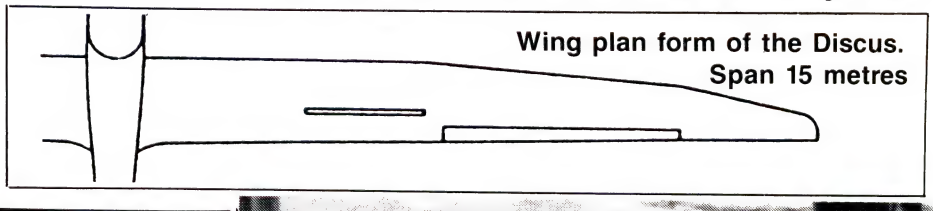
The first experiments with models were very encouraging. The winner at the F3B World Championships in Germany, Reinhard Liese, and the 5th placed Tarantula by Amman Rainer, had so-called Schuemann wings. The idea became something of a fashion, and many gliders with the Schuemann features, but with different dimensions, appeared as original designs and kit models.

With many designers and pilots employing Schuemann wings, the initial good reports were soon tempered with some bad reports. In essence, the Schuemann wings behaved well at interthermal speeds, but tip-stalling became a problem when thermalling. Since it was this problem that prompted the original investigation, the question arose as to what was a true Schuemann wing. Perhaps the models that were failing did not have the correct design.

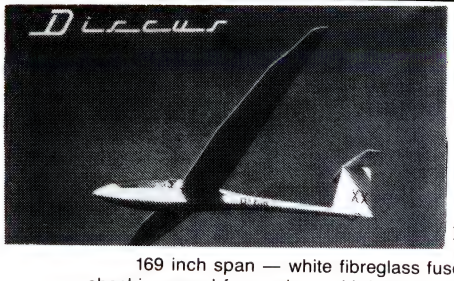
Bill Forey of Model Builder obtained the original design from Schuemann, who has accepted the range of adaptations of his design as Schuemann wing variants. There appears to be no reason why the variants should be worse than the original, providing that the straight trailing edge and swept leading edge are used. In fact, the logical conclusion is to have an elliptical swept leading edge, which can be produced on a model more easily than on a full-sized sailplane. Some models have had three and four sweep angles on the leading edge, but any performance gains are very difficult to ascertain with such small changes.

It seems likely that the risk of tip stalling with the Schuemann wing, or with any other wing for that matter, is a result of the small tip chord with its very low Reynolds number, and the high angles of attack imposed on a model sailplane wing when thermalling. The risk may be reduced by not decreasing the tip chord so much, by reducing the camber of the aerofoil and by using washout. Schuemann pointed out that the original design on the ASW 12 had 1° washout.

In summary, the same principles as have always applied need to be remembered: design and build the wing carefully, but don't fly it outside its proper performance envelope. Avoiding tip stalling (stalling) is as much a matter of good flying as it is of using the latest design features.



Wing plan form of the Discus. Span 15 metres



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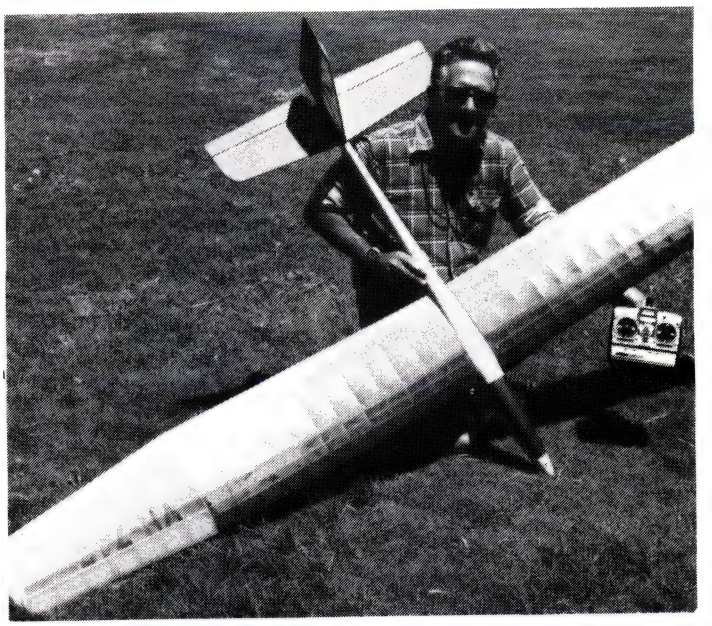
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A Foka 4 by Rob Goldman. A superb model of the same series made famous by the late Brian Laging with his World Record duration flight.



Here's John in his Elfe, map in hand, looking out as he eases into a left turn. Note: mode 2! Waikerie Glider Rally photos from Martin Simons.



Mal Pring, winner of Constellation soaring contest in December last year, still covers wing and tail with silk and dope. It does not go slack in the heat like some IOFs, and retains rigidity of the wings during rapid descents. Mal uses only rudder and elevator controls; his skill overcomes the lack of spoilers. In this pic from Don Howie he is holding his JR computer radio to ensure that no-one else lifts it!

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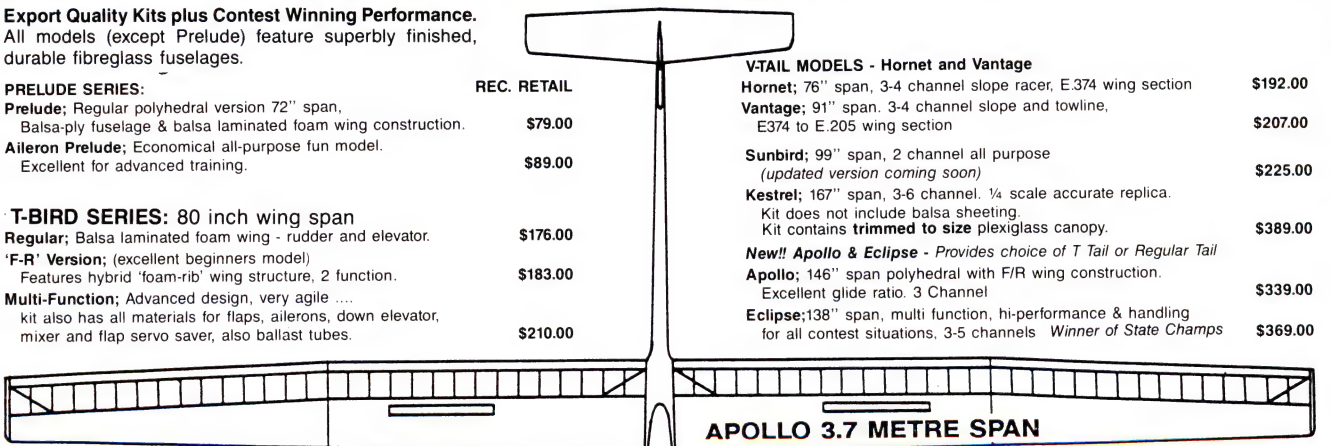
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Flight Analysis No. 71

by Martin Simons

41. THE END

Early in 1981 the Editor suggested that I might like to take over his regular Flight Analysis series for a few issue. The first of my efforts appeared in June 1981. The few issues became something over fifty. AIRBORNE itself has now reached its century.

Does Theory Matter?

I thought that it would make a tidy end to this series if I spent a little time on the question of whether the practical model flyer needs to understand the theory of flight.

In one sense the answer is clearly no. Many people build and fly model aircraft of all kinds with little or no theoretical understanding, just as many people drive cars quite well and safely without any notion of what mechanical action goes on inside. In fact, a good many quite successful modellers have, for one reason or another, taken hold of some quite erroneous theoretical ideas about the way air behaves, yet their aircraft sometimes fly quite well enough and they seem to be content with the results. If the model gets up into the air and doesn't disintegrate or come crashing down instantly, there can't be too much wrong with the model itself, however confused the ideas of its owner may be. (Some ideas, I must say, are very confused! It is also worth remarking that some of the most muddled ideas are the most deeply entrenched. I say a little more about this below, but to explain them all would take another fifty issues of Airborne.)

We have no right whatever to criticise model flyers whose interest is simply in flying. We are all, presumably, in this game for fun, and let us have fun in whatever way we can, providing that we don't endanger or harm anyone else. We do not expect everyone who drives a car to have built it first, nor to have designed it, or to have studied the theory of internal combustion engines, the chemistry of petroleum and the cultivation of rubber. Why should they?

So why bother with aerodynamic theory? My own reason is that **this, too, is part of the fun.** Whether the model is flown right out of the box, or built from a kit or from scratch, I like to understand what is going on in the air just for the sake of understanding. Maybe having a good theoretical background does, in the long run, make a better pilot and better builder of models. I certainly hope that when something goes wrong I have a fair idea of what the cause is and may be able to get out of trouble a bit quicker for that reason. Quite often, too, I think that a little accurate explanation can help other modellers to avoid bad mistakes, both in designing their aircraft and operating them safely. But whether this is true or not, it is not my main reason for theorising. I like to know what is happening and this adds to my enjoyment. Even when I am not skilful enough to save a situation, I still get a certain interest out of recognising what caused the disaster!

There is, however, more fun in it than this. One of the best things about model flying is that one can, without too much sacrifice of time, money and energy, carry a project through all its stages from beginning to end.

There are very few opportunities in aviation nowadays where an individual can do this. It is, of course, still feasible to build a full-sized light or ultra-light aeroplane or glider at home. The cost, especially in time, is enormous. I once rebuilt, from a wreck, a fifteen metre wooden sailplane and flew it afterwards. It took almost every minute of my weekends and holidays for over two years, and this was really only a repair job. During this time I had to force myself away from the workshop sometimes in order to make sure that I was still sufficiently in practice to fly my sailplane when, at last, it should be ready. I began to feel guilty when I was flying because the work was not advancing, and guilty when the work was advancing because my flying skills were getting rusty! The fun began to go out of it, although it is satisfying to hear from the present owners that the aircraft is still flying well, more than twenty years afterwards.

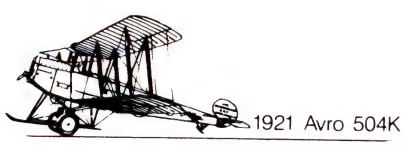
There are kits for home-builders, it is true, but often these turn out to be little more than plans and quantities of materials. Completion seems invariably to require years rather than months, and, despite claims to the contrary, a lot of money is needed too, in the end.

To start right at the beginning, by designing a full-sized aircraft, proving the aerodynamic design and stability, stressing the structure and making sure of eventual certification, requires much greater sacrifices. A friend who did all this took more than seven years, and I know of two projects which lasted over fifteen. The original enthusiast, in each of these cases, simply gave up, exhausted, and the half-completed project had to be finished by a different group altogether. With such huge commitments the fun seems to vanish. How depressing it must have been to realise, after such a long, drawn-out struggle, that these aircraft were twenty years obsolete by the time they had their first test flights! How heartbreaking if the product turns out not to perform well, or to be unpleasant to handle in the air, or even unsafe and unflyable! These things can happen to the home-builder.

In full-sized commercial aviation the whole business has been divided and subdivided so that hardly anyone follows a project right through. Pilots do not generally build or design aeroplanes. Those who do build them tend to specialise: one works on undercarriages, another on avionics, another on interior fittings, another on wings. Those who build do not design; those who design do not build. Even in the design office, while the chief designer is in overall control, all the detailed work is done in bits. The group working on structures may never know why the aerodynamicists adopted a particular form. The tail is a separate problem from the fuselage and from the wing, so each has its own group of specialists and so on down to the smallest components. The tail designers may never have calculated a stability equation. Someone else does that. Someone else also works out the basic specification for the project, someone else does the costing, someone else buys the materials, and, at the end of the financial year, someone else again adds up the accounts! And someone else does the test flights.

Model flyers can design, build, fly, modify, repair, redesign, rebuild and fly again, without having to dedicate a lifetime to any one special aspect of the process. There is a profound sense of satisfaction when the model that began with a gleam in the eye or a scribble on an envelope has been proved in flight. Perhaps one begins with a hint of an idea, or a puzzle arising from a set of contest rules, or the sight of someone else's model flying well or badly, a comment in a magazine or a question from another modeller. One may next make a rough sketch, jot down a few elementary figures and follow up with a more exact and careful process of design and drawing. Then the materials are selected, the building is carried through to its conclusion and the model is finished and flown. This is not the end, for there are further experiments and improvements to be made and, sooner or later, repairs or even rebuilds to be done. No great harm results if the thing does not work out well. A project can be shelved for a time or even abandoned without anyone feeling profound sorrow or guilt.

To design a model aircraft is not especially difficult, and many people do it to some extent. I believe that it is quite unusual for any modeller to build a model exactly to the original plans; nearly everyone seems to have ideas of improving or strengthening an existing design. I do not, however, count it as truly designing a model to take an existing successful design from someone else and copy it with a few insignificant modifications. This tends to produce stagnation. Designing is more radical. To take the process from the envelope sketch stage all the way to the finished product does require some correct basic theory, and I personally would find it very difficult to continue as a model flyer if I could not do this. This



1921 Avro 504K

Passenger aircraft have developed from this .....

with the application of a little theory

Modelling will be mighty in Nineteen ninety!

does not prevent me from building from other people's plans. I do so occasionally, but the fun is nohinbg like as great as when I design everything myself.

So, theory is, for me, one important component of the model flying sport, part of the fun. People who don't get fun out of model designing and theory of flight are missing something worthwhile. I hope that I have shown, in the articles that I have written for AIRBORNE since 1981, that one can understand basic aerodynamic theory quite well without having to do any calculations. People seem to be unduly frightened by figures but, fortunately, there are very few things in model aeronautics that do require serious mathematics. That, as far as I am concerned, is another reason why no-one should be afraid of aerodynamic theory. Most of the time all that is needed is a little imagination coupled with common sense.

The only other important requirement is a readiness to rid the mind of old, muddled notions, however deeply dug-in these may be. In a sense, every model flyer is already a theorist. One only has to join the talk at a club meeting or on the field to hear theories being expounded with almost every breath. Those who pride themselves most on being thoroughly practical are often the first to utter some theory to support their practice or to explain why someone crashed a model. They may even be right! But far too often they are not.

Like many other model flyers of my generation, I grew up as an avid reader of the few model magazines and books that were available in those times. I supposed that I, an ignorant schoolboy, ought not to doubt the pronouncements of greybeards who had been flying models since before I was born. Others obviously felt as I did. I remember once talking to a school friend and asking him why his model had such a large fin area. His answer was "Because ****** (a famous modeller) in Aeromodeller says so, and what he says goes!" I now know that the well known writer's theory was quite mistaken, but that discovery came years later.

In fairness to their memory, some of the earlier theorists did know what they were talking about, but as my own experience developed I began to realise that something was wrong in the model flying world. It was not necessary to be very clever to see this. On almost every topic, supposedly knowledgeable authors could be found contradicting one another. In cases of contradiction both statements cannot be right. Indeed, both may be wrong!

It was quite difficult to face up to this because some of the idols I revered began to look as if they had feet of clay after all. For example, I discovered from someone who knew the man intimately that one of the most famous modellers, whose book was almost a bible in its time, had built only three flyable model aircraft in his life, and with these had made about twelve successful flights all told. Another whose words I once took for truth, it transpires, did not build his 'flying' models for flying at all but almost exclusively for static exhibition. Yet he too published a book about model design, and everyone took it seriously. With hindsight, when I take that old book off my shelf today, I can see that the models, if built to those plans exactly, would probably have broken in the air. It is perhaps not very surprising that theories emanating from such sources should be mistaken. They nevertheless caused, and still cause, a lot of confusion. One wonders how they ever got into print, and I have to say, how is it that some of these errors still get into print?

It seemed essential to me to try to sort out some of the confusions; to separate the grain from the chaff. I did not, in fact, study aeronautical engineering at university or college. All I did, and all anyone else needs to do, is visit a good library and borrow a few reoputable books. With some reading and readiness to test ideas fairly in real flying practice, anyone at all can enjoy model flying in all its aspects. Theories are useful only if they work in practice. To the practical theorist every model flight is a test of theories. If a theory fails under test, which does happen sometimes, it is the theory that has to be redesigned before the model can be. That is a lot of fun.

Now as a last exercise, I would like every reader to place a hand on the heart and repeat the following catechism:

I promise never, ever, under any circumstances whatever, to speak of semi-symmetrical aerofoil sections, because this phrase is without meaning and reveals only confusion of the mind. A section which is not symmetrical is cambered, and what matters is how much it is cambered.

I believe that the camber of a wing section is found only by examination of its centre line.

I undertake never again to refer to the Phillips Entry unless I am pointing at the time to the diagram contained in the patent application of Horatio Phillips dated 1891.

I undertake, when speaking of the Clark Y aerofoil section, to mean only the Clark Y aerofoil section, 11.7% thick and with 3.6% camber, as designed by Virginius Clark.

I aver that I shall not confuse trim or balance point with stability, and shall keep the centre of gravity of all my model aircraft well forward unless I want to have an accident.

I promise never to frighten beginners with ill-informed talk about turning upwind or downwind, since the model in flight responds only to the air flowing over itself and not the wind felt by people on the ground or that coming out of my mouth.

I believe that a wing will stall if its angle of attack is too great, whatever its airspeed.

I shall not build wings with knife-like leading edges because these do not improve the airflow and may cause dangerous stalling behaviour.

I promise never to try to turn a flying model without banking, because a flat turn is an abomination.

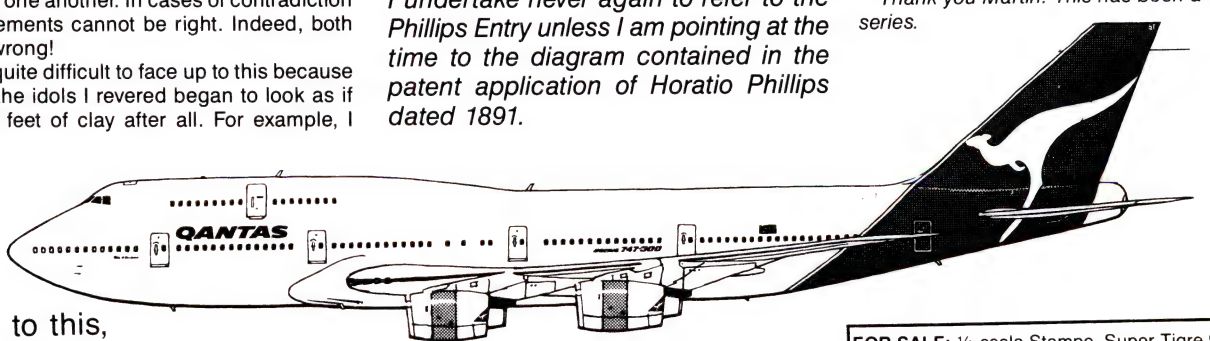
And I accept that if I am detected in doing any of these crimes or forgetting any of these truths, I shall be condemned to a lifelong search, through daytime, night-time, winter, spring, summer and autumn, in my own house and that of my model flying friend to find the back issues of Airborne Magazine in which my errors and confusions are exposed and corrected. And I shall read them all again.

AMEN

Now, where's that drawing board?

THE BEGINNING .....

Thank you Martin. This has been a wonderful series.



..... to this,
now and then!

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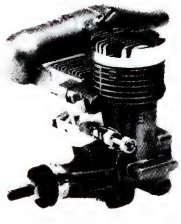
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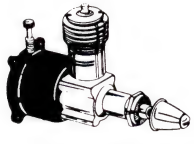
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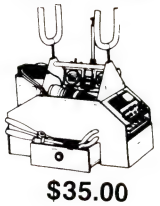


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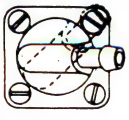
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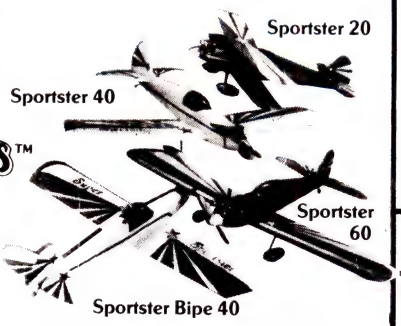
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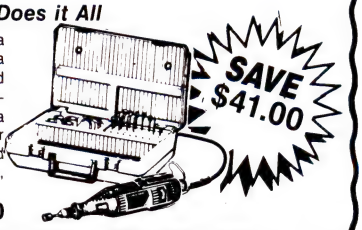
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Glassfibre fuselage, foam veneered wings, Plug-in wings and tail. Semi-scale. For 2 ch. radio. Easy to build and fly. 2 metre class, high performance slope and thermal sports flyer.



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Aerobatic Slope Soarer



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74 inch span, suit 3 ch RC
All balsa/ply construction

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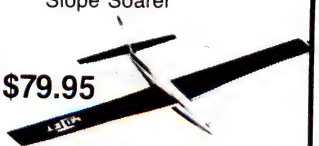
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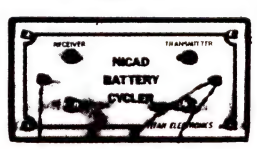
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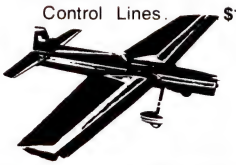


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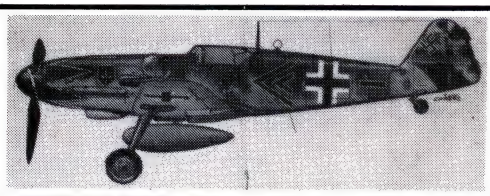
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This very successful model has excellent flying characteristics and it looks great.
KIT CONTAINS: Fibreglass fuselage, foam core wings, fibreglass wing tip, balsa wood for rudder and tailplane (full size in plan), balsa wood planking material for wings, clear plastic sheet for windows, wing frames four pieces, complete front and back undercarriages with springs, large four inch inflatable wheels, 14 oz tank, hinges and wingbolts, plan.

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Wingspan: 2100 mm
Length: 1620 mm
Weight: 2400 g
Complete fibreglass kit



PRICE: $595.00
with foam wings $395.00

KIT CONTAINS: Fibreglass fuselage, fibreglass wings with moulded engine cowlings with panel markings and rivets, balsa wood material for flaps, rudder, ailerons and elevator, 10 wheels, 2 fuel tanks, 2 spinners, decal sheet, fittings and plan.
Designed for 2 x 40 2-stroke or 2 x 60 4-stroke engines.

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Wingspan: 1920 mm
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Weight: 2300 g



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KIT CONTAINS: Fuselage, wings and tailplane made completely out of fibreglass, balsa wood material for flaps, rudder ailerons and elevator, clear plastic canopy, 4 wheels, fuel tank, fittings and plan.
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Wingspan: 1900 mm
Length: 1620 mm
Weight: 2500 g
Complete fibreglass kit



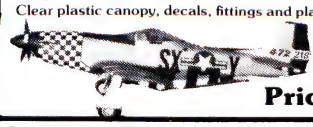
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KIT CONTAINS: Fuselage, wings, tailplane, flaps, rudder, elevator and ailerons made completely out of fibreglass, with detailed panel markings and rivets in all surfaces, clear plastic canopy, fuel tank, decals, fittings and plan.
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FOCKE-WULF; a smaller version, which flies like a trainer and looks great;
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Mustang P-51D

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P-82 TWIN MUSTANG
TECHNICAL DATA
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Length 1300mm
PRICE $435.00



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Maricardo:; 1142 mm; mid wing; TD; .35 to .40 engine, 4 channel radio; Looks like a racer, flys like a trainer **$12.00**
Miss Keeto: Cabin model; 1420 mm; low wing, bi-convex aerofoil; trike or TD; for .19 to .40 engine; 3 functions **$8.00**
Mite: 940 mm; low wing; TD; 2 x .15 to .19 engines, 4 ch **$10.00**
Mongster Bipe: Biplane; 725 mm span; .15 engine; 4 channel radio ... **$12.00**
Moonglow VI: 1520 mm; low wing; trike; .61 size; 4 ch; aerobatic **$13.00**
Moon Probe: 1065 mm; low wing; trike; .19 to .23 engine; 4 ch; **$10.00**
New Era 3: 1120 mm; mni-pattern; low wing; trike; .19 to .30; 4 ch; **$12.00**
Omen: by Peter Kraus. 1520 mm; .20 to .30 engines; 3 ch; **$10.00**
Painted Lady; 1370 mm; Biplane; TD; .45 to .61 engine, 4 ch; **$24.00**
Parakeet: by Russ Hammond. 1300 mm; .15 engine; 3 ch; radio **$12.00**
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Pasadena Special: 990 mm; Mini biplane; TD; .29 to .40 engine; 4 ch; quick building **$12.00**
Pelago:; 1610 mm; low wing; TD; .49 to .61 engine, 4 channels; sporty cabin style **$13.00**
Pushover: 935 mm; mid wing; trike; .15 to .20 engine; 3 ch; mini pattern **$9.00**
Pussyfoot: 1220 mm; low wing; TD; .29 to .40 engine; 4 channels; inset ailerons; open cockpit **$10.00**
RG 5: 1520 mm; shoulder wing; TD; .35 engine; 4 ch; symmetrical wing section; upright engine **$24.00**
Roulet II: 1370 mm; parasol wing; TD; .19 to .40 engine; 3 ch; **$11.00**
Sandpiper: 1370 or 1800 mm; shoulder wing; trike; .60 engine, 4 channels; aerobatic **$13.00**
Senior Telemaster: 2400 mm; high wing; TD; .61 engine; 4 ch; **$28.00**
Sky Chief: 1320 mm; low wing; TD; .29 to .40 engine; 4 ch; **$11.00**
Sky Shark: 2000 mm; high wing; 1.5 cc engine; 2 ch; powered soarer . **$10.00**
Skystreak: 1340 mm; low wing; trike;for 3.5 cc engine; 4 channels **$14.00**
Snappy Mills: by Don Howie: 940 mm span; high wing; TD; .061 engine; 2 or 3 ch . **$7.00**
Snark: 1122 mm; low wing; trike; .35 to .40 engine, 4 ch; aerobatic **$11.00**
Square Shooter: Simple boxy model; 1170 mm; low wing; TD; for .25 engine and 4 channel radio **$9.00**
Stingray: by Alan Lehmann: Delta wing; 813 mm span; for .09 to .18 engine and 3 channel radio **$10.00**
Strike Master: Jet fighter lines; 1365 mm span; high wing; trike; for .40 engine and 4 channel radio **$14.00**
Stringalong: 1900 mm; Biplane; TD; .49 to .60 engine, 4 ch; slow flyer **$22.00**
Swee' Pea: 1160 mm; high wing; TD; .19 to .25 engine, 3 channels; small aerobatic cabin model **$9.00**
Swiftee Too: 1220 mm; low or shoulder foam wing; TD; .40 engine and 4 channel radio **$12.00**
Tarqueen: by Merv Buckmaster; Powered soarer; 2310 mm span; for .09 to .25 engine and 2 or 3 channel radio **$11.00**
Tranquiliser: 1520 mm; parasol wing; TD; .40 engine, 3 or 4 ch; **$11.00**
Warrior; 1800 mm; low wing; trike; .61 engine, 4 ch; aerobatic **$14.00**
Wayfarer: 1370 mm; Biplane; .40 to .60 engine; 4 ch; **$16.00**
Winter Special: by Bill Winter and Bill Kaluf. 1983 version of 1947 design; for .40 4-stroke engine; 5 controls **$21.00**
Wot Knot: 1168 mm; shoulder wing; TD; .19 to .40 engine; 4 ch; **$12.00**
Yoko: 1730 mm; low wing; TD .60 engine, 4 channels, aerobatic; radial cowl; sheeted wing **$13.00**
Zonda: 1270 mm; shoulder wing; TD; .29 to .40 engine; 4 channels; aerobatic cabin model **$11.00**
½A Quanger: 1828 mm; shoulder wing; 1 cc engine; powered soarer by M. Buckmaster **$13.00**

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Frog Jackdaw: 60 inch; high wing; TD or trike; 35 to 40 engine; 4 ch . **$13.00**
F 400: 1500 mm; high wing; trike; .40 to .50 engine; 4 ch; **$12.00**
Furfy Trainer: 1380 mm; for .19 to .40 engine and 4 channel radio **$12.00**
Gatsby: by Alan Lehmann. Sport bi-plane; span 1 metre, for .15 to .21 engine and 3 channel radio **$13.00**
Hot Drop 2: 1320 mm; high wing; TD; ideal first model; for .15 to .25 engine; 3 functions **$13.00**
MCA: by Vin Masters; 1600 mm; .29 to .49 engine; 4 ch; **$14.00**
Maricardo: 1142 mm; mid wing; TD; .35 to .40 engine; 4 ch; looks like a racer, flys like a trainer **$12.00**
MiniDrake: by Celestino Rossi. 1600 mm span pusher; for .049 engine and 2 channel radio **$12.00**
Miss Muffet: by Paul Lagan. Aerobatic trainer; span 1300 mm; for .25 to .40 engine; 3 or 4 channel radio **$12.00**
Parakeet: by Russ Hammond; 1300 mm; .15 engine; 2 or 3 ch; **$12.00**
P-Ship: by Merv Buckmaster; 3-piece wing for choice of 1200 or 1800 mm span; for .15 to .29 engine and 3 channel radio **$13.00**
RG 5: 1520 mm; shoulder wing; TD; .35 engine, 4 channels, symmetrical wing section, upright engine **$24.00**
Roulet II; 1370 mm; parasol wing; TD; .19 to .40 engine; 3 ch; **$11.00**
Sandpiper: 1370 or 1800 mm; trike; shoulder wing, .60 size, 4 ch; **$13.00**
Snappy Mills: 930 mm; high wing; TD; .10 size, 2 or 3 ch; **$7.00**
40/60 Trainer: 1485 mm; high wing; trike; .40 engine; 4 ch; **$12.00**

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fuselage and wing shape of eagle **$10.00**
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Javelin: Thermal; by Dario Mestrovic. 2 metre span; (2 sheets) **$15.00**
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Phase One: Slope; 1830 mm; high wing; T-tail; 3 functions **$10.00**
Pippita: Thermal; 2280 mm; shoulder wing; 2 channel radio **$12.00**
Probe: Slope; 1520 mm; high wing; 2 or 3 ch; V-tail **$9.00**
Rex 1A: Thermal; 2840 mm; high wing; 2 ch; **$13.00**
Ridge Runner: Slope; 1820 mm; low wing; ailerons; elevators; 2 ch; **$10.00**
Riser: Unusual slope soarer, by Hugh Patrick; 2800 mm;
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POWERED SOARERS

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½A Quanger: by Merv Buckmaster. 1828 mm; span;
for engine up to 1 cc; 2 channels **$13.00**
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Whisper 3: 1778 mm; for 7 cells **$12.00**

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CONTROL LINE

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Bunyip: ½A Speed model by Ivars Dislers **$5.00**
De Bolt Biplane: 700 mm span; for .61 engine **$11.00**
Demon: Combat; 890 mm span; for .29 engine **$8.00**
Firecracker: by Brian Eather. Super stunter; 1500 mm span; .49 engine **$17.00**
Fokker Dr1: Tri-plane stunter; 800 mm span; for .19 to .25 engine **$8.00**
Formula S: Stunter; 1420 mm span; for .35 to .40 engine **$12.00**
Mike Argander Special: 1/8 scale Mini Goodyear Racer; for .09 diesel **$10.00**
Mini Bandolero: Profile stunter, by Frank Coombs;
for .15 engine; (2 sheets) **$13.00**
Mini Nobler: Profile stunter, by Frank Coombs; .15 engine; (2 sheets) **$13.00**
Mongoose: 2 cc Speed model by Ivars Dislers **$5.00**
Mustang P 51: 1200 mm span; for .09 to .25 engine;
also suit conversion to RC **$16.00**
Olympus: Profile stunter, by Frank Coombs; for .15 engine; (2 sheets) **$13.00**
Piranha: by Maris Dislers. For ½A Combat. Simple & tough **$10.00**
Rossi Sidewinder: F2A, by Robin Hiern; for .15 engine **$13.00**
Sam: Trainer by Esterco Barsic. 500 mm span; for .049 engine **$9.00**
Spud: by Maris Dislers. Combat; for .15 engine **$11.00**
Sundance: Stunter; 1370 mm span; for .35 engine **$10.00**
Tearalong: Combat; 890 mm span; for .15 engine **$8.00**
Tissue Trim: by Frank Coombs. Simple racer; for .09 to .29 engine **$11.00**
Trinity Trainer: by David Bevan. 600 mm span for .15 engine **$7.00**
U-Control Trainer: from Hobbies Illustrated 1948 ..... **$8.00**
Warhawk P40: Semi scale with flaps; 1420 mm; for .35 to .40 engine **$10.00**
Winder: Combat; 1065 mm span; for .19 engine **$14.00**

FROG SERIES

Frog Aerobat: CL stunter; for .15 engine **$10.00**
Frog Attacker: CL Stunter; 1270 mm span **$11.00**
Frog Cirrus: FF rubber; 965 mm span **$10.00**
Frog Diana: FF glider; 915 mm span **$9.00**
Frog Firefly: FF power; biplane **$7.00**
Frog Fox: FF power; 40 inch span; 1.5 cc diesel; pylon **$8.00**
Frog 45: FF power; semi-scale; 1145 mm span **$10.00**
Frog Goblin: FF hi-wing rubber; 610 mm span **$8.00**
Frog Jackdaw: RC; 60 inch span; 35 to 40 engine; 4 ch **$13.00**
Frog Janus: FF power; 1145 mm span; .09 diesel **$9.00**
Frog Jupiter: FF rubber; 930 mm span; **$7.00**
Frog Mamba: FF rubber; swept wing; 480 mm span **$8.00**
Frog Minx: FF rubber; 762 mm span **$7.00**
Frog Mirage: 5cc CL Team Racer (Class B) **$8.00**
Frog Nimrod: FF; semi-scale for .049 engine **$7.00**
Frog Petrel: FF Glider; 33 inch span; **$8.00**
Frog Powavan; FF power; pylon type; for 0.75 engine **$9.00**
Frog Prince: FF or RC Glider; 60 inch span; 3 ch; **$10.00**
Frog Radius: CL; 560 mm span; for .09 diesel **$7.00**
Frog Special Series: 5 rubber plans on 1 sheet **$13.00**
Frog Sprite: FF Rubber; 613 mm span; **$7.00**
Frog Stratosphere & Strato D: FF power;
1065 mm span; for .09 engine **$11.00**
Frog Tarquin: FF power; high swept wing; engine on pylon;
990 mm span; for .09 engine **$11.00**
Frog Tutor: FF power; semi-scale;
1090 mm span; for ,09 engine **$11.00**
Frog Vanda: FF glider; 1010 mm spam **$8.00**
Frog Vanda Mk II: FF glider; 1020 mm span **$8.00**
Frog Vandiver: CL; aerobatic; 685 mm span **$9.00**
Frog Vanfire: CL; 1016 mm span; .30 engine **$12.00**
Frog Vantage: CL; .5 cc Team Racer (Class B) **$9.00**
Frog Ventura: FF glider; 1065 mm span **$8.00**
Frog Venus: FF rubber; 38 inch span **$9.00**
Frog Vespa: FF glider; 762 mm span **$8.00**
Frog Vixen: FF power; 940 mm span; .09 engine **$8.00**
Frog Witch: FF rubber; 915 mm span **$8.00**
Frog Witch II: FF rubber; 36 inch span **$8.00**
Frog Wren: FF glider; 635 mm span **$6.50**
Frog Zephyr: FF rubber; 840 mm span **$8.00**

R.C. SCALE

Acro Star: 1270 mm; aerobatic biplane; TD; .40 engine; 4 ch; **$21.00**
Aeronca Champ: 1800 mm; high wing; TD; .40 engine; 4 ch; radio **$13.00**
Ansaldo SVA 5: 1300 mm; Biplane; TD; .40 engine; 4 channels; ailerons on upper wing only **$10.00**
Avro Avian: by Arthur Bugden & John Farmer. 1/4 scale; 2300 mm span; for 1.2 4-stroke engine; (2 sheets) **$30.00**
BAC Superdrone: by Roy Dray. 1/4 scale; 3 metre span; for .40 4-stroke engine **$22.00**
Baby Ace: 1650 mm; parasol wing; TD; .40 to .45 engine; 4 ch; radio **$20.00**
Bebe Jodel D9: 1470 mm;low wing; TD; .29 to .40 engine; 4 ch; **$12.00**
Bristol Bullett: 1200 mm; Biplane; TD; .61 engine; 4 ch; **$14.00**
Chipmunk: 1730 mm; R.A.F. trainer; low wing; TD; fixed u.c.; for .45 to .61 engine; 4 functions **$22.00**
Citabria: 2600 mm; high wing; TD; Superb first big plane; for .61 geared engine or .90 Quadra and 4 channel radio **$40.00**
De H Moth Minor: Outlines & details only, drawn by Bill East. 1/6 scale; 1400 mm span **$15.00**
Dewoitine D510: Outlines & details only, drawn by Bill East. 1/8 scale; 1500 mm span **$15.00**
Druine Turbulent: 1640 mm; 1/4 scale; low wing; TD; for .40 to .60 engine; good intro to scale **$22.00**
Druine Turbulent: by Wayne Fitzgerald. 1/3 scale; for 1.2 two-stroke; (2 sheets) **$30.00**
Edgar Percival EP9: 1788 mm; high wing; TD; .61 engine; 4 or 5 channels; near- scale crop duster with working hopper **$22.00**
Fairchild 24: by Ian Carter. 1/6 scale; 1800 mm span; for .40 4-stroke engine; (2 sheets) **$22.00**
Cowl available from the designer)
Fairey Flycatcher: 1470 mm; Biplane; TD; .61 engine, 4 channels, **$30.00**
Fairey Junior: by John Mauchline. 1/3 scale; 2.3 metre span; for 1.2 four-stroke (2 sheets) **$33.00**
Fleet Biplane: Semi-scale biplane; simple construction; 1249 mm; TD; for .40 engine and 4 channel radio **$14.00**
Flut-R-Bug: by Glynn Withey. 1/4 scale; 1930 mm span; for .40 2-stroke or 10 cc 4-stroke engine; (2 sheets) **$21.00**
Fly Baby: by Jim Brennan. 1/4 scale; 2100 mm span; for .90 4-stroke engine; (2 sheets) **$21.00**
Fly Baby: 1310 mm; low wing; TD; .10 to .15 engine; 4 channels; semi-scale fun model by G. Whitehead **$10.00**
Fokker D VII: 1510 mm; Biplane; TD; .49 to .60 engine; 4 ch; **$26.00**
FMA Pucara: by Hans Heck. 1/9 scale; 1600 mm span; for 2 x .25 engines; (2 sheets) **$21.00**
FW 190: Semi-scale; 1300 mm span; TD; .40 engine; 4 channels **$13.00**
Gypsy Moth: 2280 mm; Biplane; TD; for .61 geared engine or .70 Quadra; 4 channels. **$26.00**
Hawker Fury: 760 mm; Biplane; TD; .09 engine; single channel **$10.00**
Hawker Hurricane: 1270 mm; low wing; TD; .09 to .15 engine, Single channel, easily modified for 2 channels **$12.00**
Hawker Hurricane: 1730 mm; low wing; TD; .61 engine, 4 ch., **$25.00**
Laser 200: by Steve Bode. 2500 mm span; for 1.8 engine; (2 sheets) **$30.00**
Lavochkin 5FN: by Pavel Bosak. Stand Off Scale WW2 fighter. 1120 mm span; for .35 engine and 4 channel radio **$9.00**
Lazy Ace: 1800 mm; Biplane; TD; .61 engine; 4 ch; **$32.00**
Messerschmitt 109E: 1550 mm; low wing; TD; .61 engine; 4 ch; **$26.00**
Morane 'N': 1420 mm; mid wing; TD; .29 to .40 engine; 3 channels; all flying tail **$13.00**
M.S. Epervier: Outlines & details only, drawn by Bill East. 1/6 scale; 1600 mm span **$13.00**
Mustang P 51: 1200 mm; low wing; TD; .09 to .25 engine; 3 or 4 ch; **$22.00**
Mustang P 51: 1600 mm; low wing; TD; .61 engine; 4 channels **$22.00**
Percival Gull: 1830 mm; low wing; TD; .61 engine; 4 ch; **$26.00**
Percival Provost: 1520 mm; low wing; TD; .61 engine; 5 ch; highly detailed; fixed undercarriage; flaps **$26.00**
Piper Cub: 1800 mm; high wing; TD; .29 to .35 engine; 4 ch; suit first attempt at scale **$22.00**
Pitts Special: 1120 mm; Biplane; TD; .61 engine; 4 ch; **$20.00**
Pitts Special: 1320 mm; Biplane; TD; .61 engine; 4 ch; aerobatic; high performer **$21.00**
S.E 5A: 1370 mm; Biplane; TD; lots of detail; .61 engine; 4 ch; **$25.00**
Spinks Acromaster: 1900 mm; TD; .61 geared or .90 Quadra; 4 ch; **$26.00**
Spitfire Mk IX: 1644 mm; low wing; TD; .61 engine; 4 ch; **$26.00**
Super Fli: 1530 mm; low wing; TD; .45 engine; 4 channel radio **$20.00**
Taylorcraft: 1830 mm; high wing; TD; American light plane; for .45 to .61 engine; 4 channels **$28.00**
Tiger Moth 40: 1270 mm; Biplane; TD; .40 engine; 4 channel radio **$22.00**
Tiger Moth 61: 1450 mm; Biplane; TD; .61 engine; 4 channel radio **$25.00**
Tony (Kawasaki Hien): WW2 fighter; low wing; TD; .60 size; 4 or 5 ch; **$20.00**
Volksplane: 1460 mm; low wing; TD; full flying tail; .45 engine; 4 ch; **$12.00**
Waco E: 1200 mm; Biplane; TD; .61 engine; 4 ch; **$22.00**
Westland Whirlwind: 1650 mm; low wing; TD; .30 to .40 engine; 4 ch., **$20.00**

PYLON RACERS

Cassutt Special: QM; 949 mm; shoulder wing; TD; .15 engine; 2 to 4 channels; **$8.00**
Cobra: QM; 1070 mm; semi-scale; low wing; trike; .15 engine; 2 to 4 ch; **$8.00**
De Bolt Special (FAI): 1240 mm; low wing; TD; .40 engine; 2 to 4 ch; **$12.00**
Denight Special: QM; 1070 mm; low wing; TD; .15 engine; 2 to 4 ch; **$9.00**
El Bandito: QM; 915 mm; shoulder wing; TD; .15 engine; 2 to 4 ch; **$8.00**
Hue-N-Cry: Formula S; by John Hughan **$12.00**
Little Gem: by Paul Lagan. Early QM design. Span 1 metre; for .15 engine; 2 to 4 channel radio **$12.00**
Little Mike: 1170 mm; shoulder wing; TD; .40 engine; 4 ch; **$10.00**
Little Toni: FAI; 1270 mm; low wing; TD; light weight; for .35 engine; 2 to 4 channel radio **$12.00**
Miss Cosmic Wind: QM; 890 mm; shoulder wing; TD; .15 engine; 2 to 4 channel radio **$8.00**
Miss Muffett: by Paul Lagan. Formula S; 1300 mm span; for .25 to .40 engine; 3 or 4 channel radio **$12.00**
Ole Tiger:; ½A; 790 mm; mid wing; TD; .049 to .051 engine; 2 ch; **$7.00**
P. 51 Mustang: FAI; 1450 mm; low wing; TD; .40 engine; 2 to 4 ch; **$16.00**
Photon: by Danny Maslowicz. QM; 1200 mm; .15 engine; 2 to 4 ch; **$12.00**
Rivets: FAI; 1220 mm; low wing; TD; .40 engine; 4 ch; **$13.00**
Shoe String: QM; 1015 mm; shoulder wing; TD; 4 ch; **$9.00**
Teara: by Max Kroone. Formula S; 1200 mm; .40 engine; 3 ch; **$14.00**
3 in 1: Shoe String, Dick Ohm, Ole Tiger; QM; 1020 mm shoulder wing; TD; .19 engine; 2 to 4 channel radio **$8.00**

R.C. PATTERN

Atlas: 1660 mm; low wing; trike; .61 engine; 4 ch; **$17.00**
Curare 40: 1420 mm; low wing; trike; .40 engine; 4 or 5 ch; **$14.00**
Curare 61: 1640 mm; low wing; trike; .61 engine and 4 or 5 ch; **$16.00**
Dicky Bird: 1420 mm; low wing; trike; .60 engine; 4 ch; **$17.00**
Eagle: by Tom Prosser; 1900 mm; 10 cc gear drive or 1.2 4-stroke engine **$20.00**
Spectre: 1650 mm; low wing; trike; .61 engine; 5 ch; flaps **$14.00**
U.F.O.: 1650 mm; low wing; trike; .61 engine; 4 or 5 ch; **$20.00**

R.C. OLD TIMER & VINTAGE

Big A-Box: by Charles Barron, 1941. Enlarged to 84 inch (2130 mm) span; for .29 to .61 engine and 3 channel radio **$16.00**
Buzzard Bombshell: 1830 mm; high wing; TD; .29 to .49 engine and 3 channel radio **$20.00**
Debbie: by Nick Limber, 1939. 1900 mm span **$14.00**
Finneran Flyer: by Jack Finneran, 1935. 2300 mm span; for 40 4-stroke or 10 cc spark ignition engine **$15.00**
Frog Jackdaw: 1942. 1500 mm span **$14.00**
Fury: by Carl Hermes, 1950. 1600 mm span; for .15 to .40 engine (2 sheets) **$14.00**
Krupp's 1937 Bowden Contest Winner: 2400 mm span; for .30 to .49 2-strokes or .49 to .61 4-strokes; (2 sheets) **$21.00**
Long Cabin (½ Size); 1380 mm span **$11.00**
Rambler: by Gil Shurman, 1939. 2400 mm span (enlarged for Texaco); for .35 to .61 4-strokes (2 sheets) **$22.00**
Torpedo: by Les Adams, 1937. 2 metre span **$14.00**
Winter Special: by Bill Winter & Bill Kaluf. 1983 version of 1947 RC design; for .40 4-stroke engine; 5 controls **$21.00**

HALF A OLD TIMER DESIGNS

Anderson's Pylon: 1937; 1130 mm span **$10.00**
Ehling's 1937 Gas Model: 1300 mm span **$11.00**
Lanzo Record Breaker: 1200 mm span **$11.00**
MG: by Mike Granieri. 1300 mm span **$11.00**
PB2: by Thracy Petrides. 1200 mm span **$11.00**
Rambler: by Gilbert Shurman. 1200 mm span **$11.00**
Playboy Cabin: 1300 mm span **$11.00**

BOATS

Bathurst Class Corvette: by Cliff Beazley. 96:1 scale 590 mm; for .05 electric motor; simple plan **$6.00**
Day Cruiser: Cruiser; 915 mm; for .29 to .40 engine and 2 channel radio **$8.00**
Deanna: Cabin cruiser; 635 mm; for .25 engine and 2 channel radio **$9.00**
EZ-Vee: V-Hull Speed boat; 810 mm; for .29 to .40 engine and 2 channel radio **$8.00**
Hydraglide: Pontoon style airboat; by Tonci Vucak. for .40 engine **$10.00**
Miss Misty: Hydro; 600 mm; for .25 engine and 2 channel radio **$8.00**
Pegasus: Flattie; 640 mm; for .29 engine **$9.00**
Thames Walton Air-Sea Rescue Launch: for electric or i.c. power **$10.00**

FREE FLIGHT

SCALE (Power)—

Bristol M1C: by Celestino Rossi.
900 mm span; for 1 cc engine **$10.00**
Convair Charger: by Ted Oram. 600 mm span; twin boom for twin rubber motors; (2 sheets) . **$12.00**
Piper Pawnee: by John Polett1.
1300 mm span; for 1.5 cc engine **$12.00**
Polish RWD4: by Jim Fullarton.
1040 mm span; for 0.8 cc engine **$12.00**
Taylorcraft Auster 4: by Paul van Leuven.
1 metre span; for 1 cc engine or electric power **$10.00**

SCALE (Glider and Rubber) —

Albatross D5: 450 mm span **$5.00**
Bell Aircobra: 600 mm span **$5.00**
Blackburn Skua: 590 mm span **$5.00**
Bristol Troup Glider: 710 mm span **$5.00**
CAB Minicat: 490 mm **$5.00**
Caudron Cyclone: 570 mm span **$5.00**
Curtiss Ascender: 410 mm span **$5.00**
Curtiss P40 D: 620 mm span **$5.00**
Douglas XB 42: 280 mm span **$5.00**
Fairchild (24) Argus: 750 mm span **$5.00**
Fairchild PT 19: 640 mm span **$5.00**
Fairey Barracuda: 360 mm span **$5.00**
Fiat G50: 680 mm span **$5.00**
General Aircraft Hotspur Glider: 590 mm span **$5.00**
General Aircraft Skyfarer: 740 mm span **$5.00**
Grumman XH4F: 460 mm span **$5.00**
Hawker Hurricane: 560 mm span **$5.00**
Howard GH1: 620 mm span **$5.00**
Interstate Cadet: 770 mm span **$5.00**
Luscombe 10: 590 mm span **$5.00**
Messerschmidt: 530 mm span **$5.00**
Miles Magister: 700 mm span **$5.00**
Miles Masters: 580 mm span **$5.00**
Miles Mohawk: 530 mm span **$5.00**
M.I.G. 3: 570 mm span **$5.00**
N.A. Mustang: 580 mm span **$5.00**
Rearwin Speedster: 700 mm span **$5.00**
Rearwin Speedster 6000: 510 mm span **$5.00**
Schweizer TG2 Glider: 780 mm span **$5.00**
Spitfire: 690 mm span **$5.00**
Spitfire 9: 440 mm span **$5.00**
Stormovik IL2: 740 mm span **$5.00**
Taylorcraft: 820 mm span **$5.00**
Taylorcraft L2B: 620 mm span **$5.00**
Vultee Vanguard: 600 mm span **$5.00**
Waco E: 530 mm span **$5.00**

POWER —

BeCa F1C: by Celestino Rossi. 1600 mm span **$11.00**
Jimmy 2 F1C: by Stuart Sherlock. 1800 mm span **$12.00**
Provincial: 813 mm; 1950 ½A power model by Bernard Marsh **$7.00**

OLD TIMERS & VINTAGE

AK 42: by Alan King, 1950.
42 inch span (1067 mm); for .12 engine **$11.00**
AK 48: by Alan King, 1948.
48 inch span (1200 mm); for 2 cc engine **$11.00**
B.B.: by Alex Barter and Bob Howie.
1580 mm span **$10.00**
Bikini: 1946 French model; 1520 mm; 1.5 cc . **$10.00**
Bunch Cadet Major: 1935.
800 mm span; for rubber power **$10.00**
Crowbar: 1210 mm; for 2.5 cc; by Basil Healy **$10.00**
Duplex: by Chet Lanzo, 1937.
1100 mm span; for rubber power **$11.00**
Eastern States Gas Champ: by Russell Simmons, 1940.
1 metre span; for 0.8 cc engine **$10.00**
Floater: by Jim Fullarton, 1939.
1 metre span; for rubber power **$10.00**
Fly Baby Cabin: by Pete Bowers, 1946.
1200 mm span; for 1.5 cc engine;
2 sheets with float plans included **$13.00**
Flying Midget: by Thracy Petrides, 1937.
1200 mm span; for 1.5 to 2.5 cc engine **$11.00**
Flying Pencil Junior: by Alan King, 1952.
1300 mm span; for 2.5 cc engine **$12.00**
French's Rubber Model: 1940. 800 mm span **$10.00**
Gnat: by Claude McCullough, 1941.
1 metre span; for 2.5 to 5 cc engine **$11.00**
Golden Boomerang: 1118 mm; 1946 power model; for 2.5 cc; by Adrian Bryant **$7.00**
Gregory's State Champ: 1949.
1300 mm span; for 2 cc engine **$11.00**
Hi Climber: by Earl Stahl, 1939.
800 mm span; for rubber power **$9.00**
Ibis: by Tim Hervey, 1934.
1 metre span; for rubber power **$11.00**
Keycraft Firefly: Cabin style; 600 mm span; for rubber power **$10.00**
Long Cabin: ½ span **$8.00**
Megow Kadet: by Phil Karnow, 1939
1308 mm span **$9.00**
Parachute Plane: 1 metre span; for rubber power **$11.00**
Pinnuto: by F. Conte, 1943.
1200 mm span; for rubber power **$12.00**
Red Zephyr: by Scientific, 1940.
1800 mm span; for 5 to 10 cc engine **$15.00**
Renning's Class C Stick Trainer: 890 mm span; for rubber power **$7.00**
Simplex: by Paul Plican, 1941.
1500 mm span; for 1.5 to 5 cc engine **$11.00**
Torpedo: by Les Adams, 1937.
2 metre span; for 2.5 to 6.5 cc engine **$13.00**
Women's Weekly Cabin Monoplane: 1935.
900 mm span; for rubber power **$11.00**
See also Frog Series on previous page.

RUBBER —

Felstead's F1D: Microfilm design by Boyd Felstead.
600 mm span **$11.00**
Hexagon Classic P30: by Celestino Rossi.
760 mm span (30 inches) **$10.00**
Tumbleweed Coupe d'Hiver: by John Lewis.
1200 mm span **$11.00**
Waltzing Matilda Wakefield: by Paul van Leuven.
1300 mm span **$11.00**
Warrigal Wakefield: by Allan Edwards.
1100 mm span **$10.00**

GLIDERS —

Bergami A1: by Celestino Rossi. 1300 mm span **$12.00**
Index: by Merv Buckmaster. 1800 mm span . **$11.00**
Panash A2: by Peter Nash. 2100 mm span . . **$12.00**
Reynard A1: by Dave Simons. 1400 mm span **$11.00**
Teen Machine A1: by Alan Hinds. 1300 mm span **$11.00**

PEANUT SCALE

Davis D1K
Gugnuc
Druine Turbulent
Hyperbipe
Puss Moth
PZL 11c
Tiger Moth
Tipsy Nipper
Zlin 250 L

Any 1 plan for . . . **$3.00**
Any 2 plans for . . **$4.00**
Any 3 plans for . . **$5.00**
Any 4 plans for . . **$5.50**
Any 5 plans for . . **$6.00**
Any 6 plans for . . **$6.50**
Any 7 plans for . . . **$7.00**
Any 8 plans for . . . **$7.50**
All 9 plans for . . . $8.00

MISCELLANEOUS

Mini Cardinal: by Mick Nearmy.
400 mm span; for CO_2 ..... **$7.00**
Ryan PT20: by Celestino Rossi
500 mm span; for CO_2 ..... **$8.00**

If you have an interest in any aspect of World War One aviation, you are cordially invoted to join **The Australian Society of World War One Aero Historians.**
For membership details contact the Secretary, Keith Keohane, 3 Alkira Circuit, Narraweena, NSW, 2099; phone (02) 982 3040.

YACHTS

Chez-When: Near scale; 915 mm; 2 ch **$13.00**
Lightwave: RM; by Adrian Brewer **$10.00**
Panda: R10R; by Frank Russell **$10.00**
Sealynx: RM; by Terry Seabrook **$10.00**
Sunspot: RA; by Adrian Brewer **$10.00**
Tasmanian Devil: RM; 1270 mm **$9.00**
Yahoo: R10R; by Adrian Brewer **$10.00**
Zero: RM; by Frank Russell **$12.00**

AIRBORNE PLANS ORDER FORM

Ropomod Productions: PO Box 30 Tullamarine Victoria Australia 3043

Please send me the following plan(s):

Plan name: ..... $.....

Plan name: ..... $.....

Plan name: ..... $.....

Please find enclosed my cheque/money order for Total: $.....

Or debit my ☐ MasterCard ☐ VISA ☐ Expiry Date.....

Card Number: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Cardholder's Name: .....

Signature: .....

NAME: .....

POSTAL ADDRESS: .....

..... STATE: ..... POSTCODE: .....

Modelling will be mighty in Nineteen ninety!

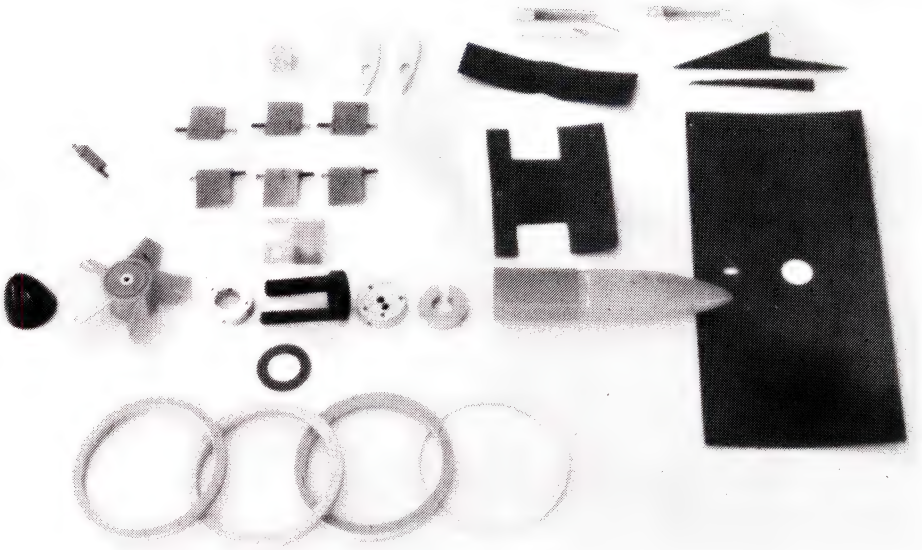
FANTAILS

by Russell Weir

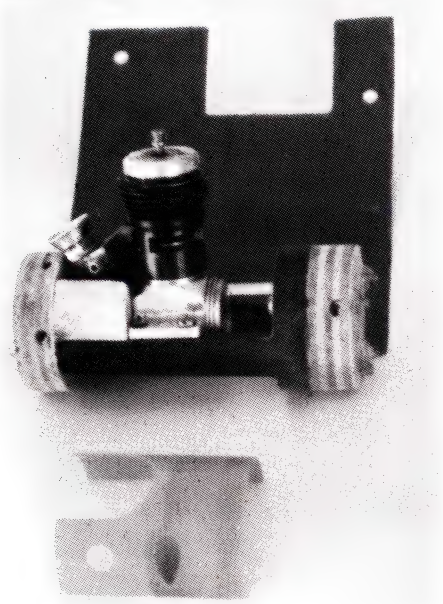
BUILT-UP FAN SYSTEMS

Ducted fan propulsion has always had the interest of modellers, and until a few years after WW2 the fan units were usually a segmented disc of metal with twisted blades, or a series of fibreboard rectangles slotted into a wooden disc for the hub. The Imp impellers are typical of this type of fan and were intended only for free flight models.

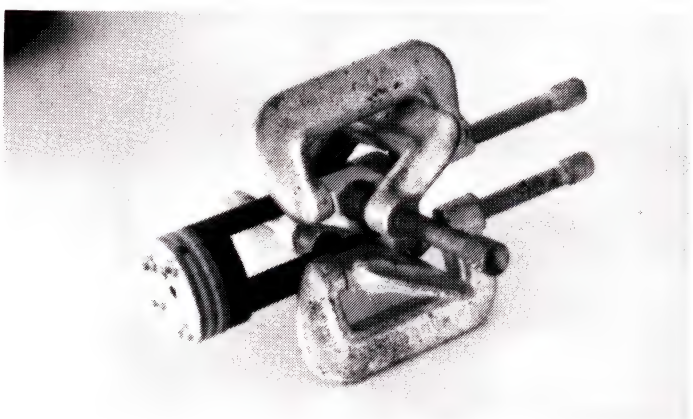
A great advance was made with the introduction of the RK ducted fan kits manufactured by Mid West. These were ready to assemble kits and the cost was not great when compared with the molded units that are currently available. I now hand over to the Editor who offers a close look at one of these ducted fan kits.



Examination of the RK049 kit began with a parts count and identification. All parts were well made and the assembly diagram and instructions were good. Compare this lot with a propeller! The four items in the top RH corner are assembly templates.



This is the engine mount ready for the wrap-around shroud. TD 051 is set well forward. Front blocks have been trimmed for needle valve and crankcase. Front ring and firewall have holes for stators that match those in the shroud. Getting correct alignment was difficult, as all external surfaces on the mount were smeared with epoxy glue. Engine has Glo Bee button head.



The firewall is bolted to the engine mount, which is made long enough for the front ring to be attached. This is supported by wood blocks, seen here clamped in place. This was a very tricky operation. Slow set epoxy was used and assembly time was prolonged by allowing overnight setting for all joints.

ULTIMATE 10 DASH 300 BIPLANE



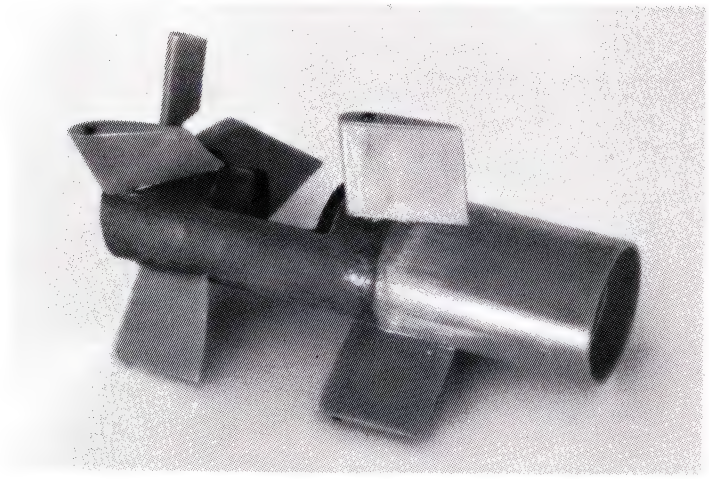
Quarter-scale, 13 lbs., 62" Span, Super Tigre 3000 Power, Fiberglass Fuselage, Foam Wings.

Sold only by reservation: $75 refundable deposit includes data package ($15 separately). Comprehensive kit, $554; powerplant, radio gear not included. These factory-direct prices are subject to exchange fluctuation and change without notice. Shipping, handling, tariff and duties are extra at cost; shipping via UPS unless otherwise requested. (Prices US currency.)

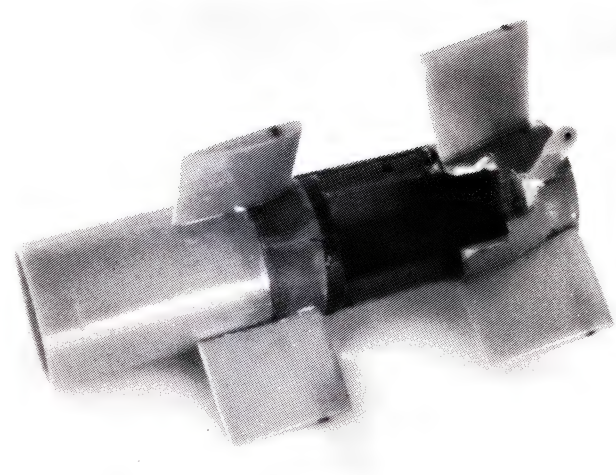
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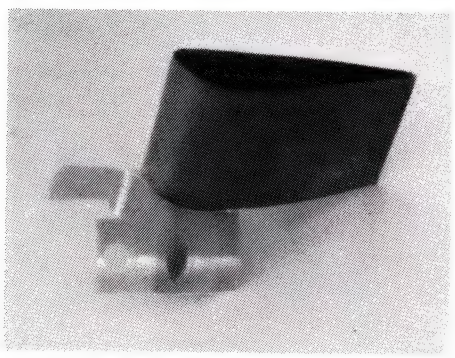
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Engine mount complete with stator blades. Each stator is attached to the centre body with a tube in a hole provided. The angle is set by a template contained in the kit. Setting the correct angles was quite tedious, as all were done in the same session and, after adjustment, any blade could be knocked crooked while adjusting another. Blades needed careful trimming to match the centre body. Accuracy was probably within 2 or 3 degrees.



Top view of the centre body with stators. The tube that pins each blade is tapped to take a screw that joins the outer shroud. File work around the front of the engine is evident. Plastic and epoxy are difficult to work in such a cramped situation. The fuel tank tail cone plugs in left, and the rotor or fan is a close fit to the front ring. The unit is exceptionally strong and very heavy.



The engine top cowl is screwed in place to the engine mount and has a shroud attached to smooth the airflow behind the engine cylinder. The shroud is set at a special angle and has to be trimmed to a snug fit inside the duct.

MINI F16

Keen ducted fan flyer, Jon Bellamy's latest model is the Mini F16 for 049 size fans. Built from the US Model Aviation magazine plan, the model spans only 32 inches and weighs 25 oz, complete with Cox TD 049 engine and Futaba 2 channel radio. Mini servos are used, of course. With the Cox turning at 18,000 rpm on 30% nitro, performance is quite impressive from a hand launch. The 1½ oz of fuel gives around 7 minutes flying time; very economical.

Keeping a model such as this very light is most important, as there is no reserve of power available. The F16 glides very well, and has been slope soared. This type of model would be the most economical way of flying ducted fans, however, everything must be just right to achieve success.

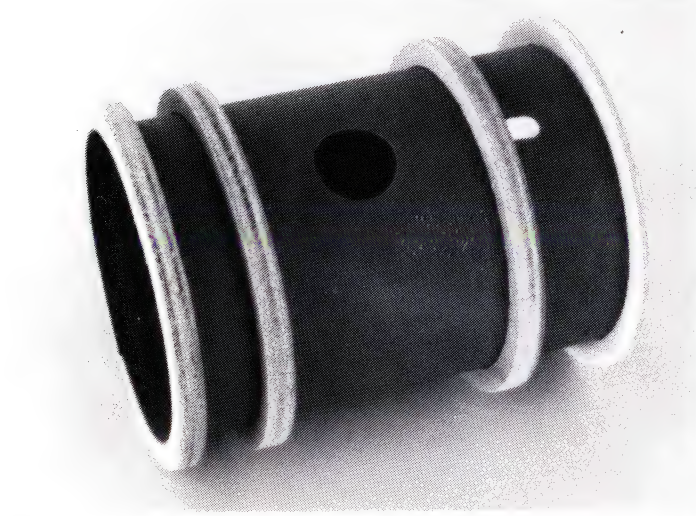
FAN FLYS MEETINGS

1990 Fan Fly at Leeton

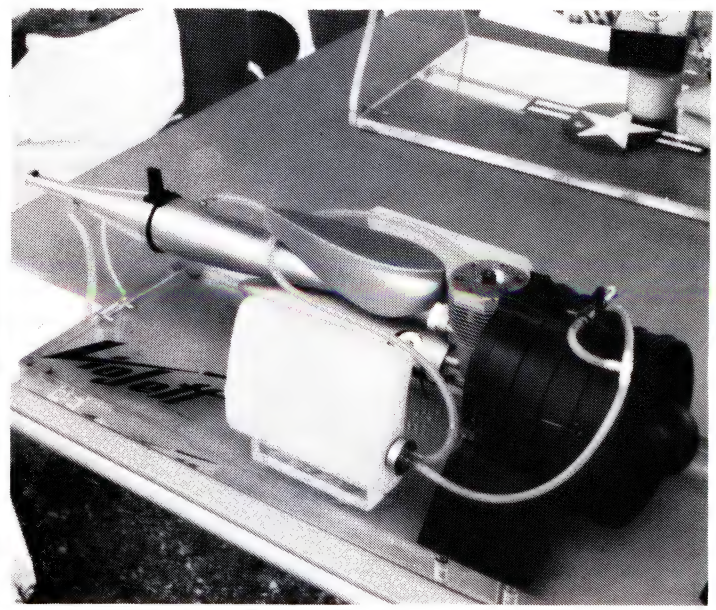
October 13th & 14th are the dates to remember for the second ducted fan fly at Leeton, NSW. The first meeting, in 1989, was a great success, with models from Qld, NSW, Vic and the ACT. Leeton is gearing up for an even bigger and better meeting this year. For meeting details and motel accommodation information, contact Jon Hull on (069) 55 1253 [AH]. Book now, as there will be a large demand for the available facilities. SEE YOU THERE!

Melton Fan Fly Video

The video of the Melton (Vic) Fan fly is now available. With long running time and spectacular filming techniquws, this is one of the best Fan Fly films available. Cost is $33, including postage anywhere in Australia. Order from Melton President, Kevin Bardsley, (03) 743 1525 [AH].



The outer shroud or duct that is attached to the engine and fan mount. Circular hole is for access to the glo plug. Plywood rings are cut fairly well, but special card material needs very careful trimming to get proper fit. Stators and fan blades then have to be trimmed to fit the duct. Not done at this stage, but assembly time was inordinately long.



The highly developed and highly successful Viojett DF system designed by Bob Violet. K & B engine, fan, shroud, fairings and tanks all specially engineered. Performance is exceptional, and so is the price! R.W. pic.





Jon Bellamy's sort of F16 with Cox TD 049 power system. Wings are sheeted and fuselage is stringered. Good access to engine spinner aids with starting. Low fuel consumption retains economy with 30% nitro fuel. Photos from the columnist.

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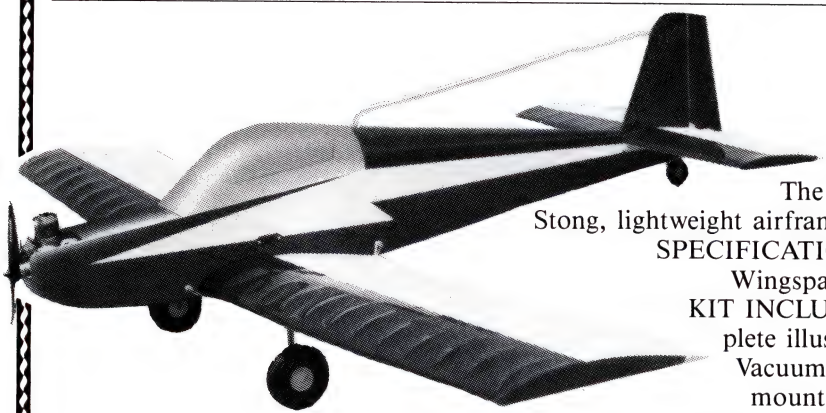
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TELEMASTER COUPE 66

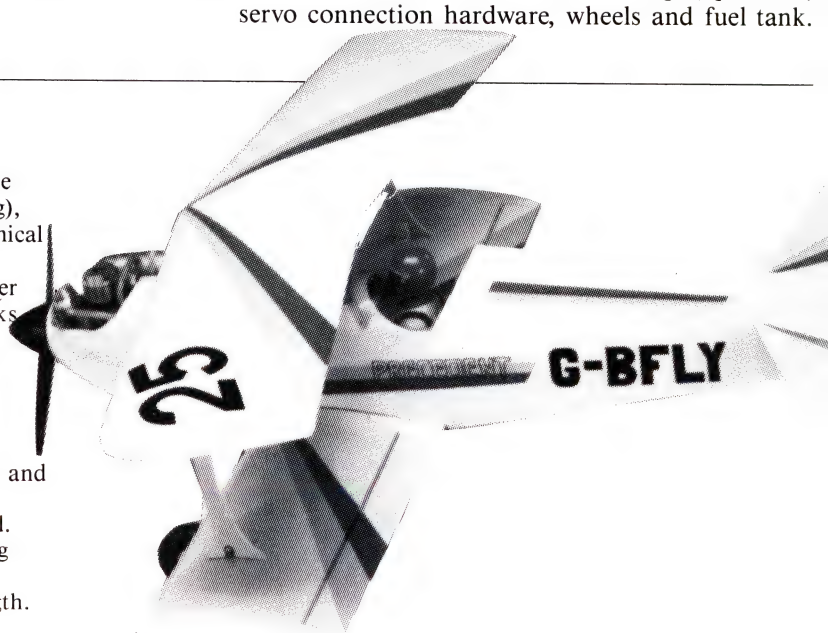
The world's best low wing trainer for beginners.
Stong, lightweight airframe. Best assembly instructions for beginners.
SPECIFICATIONS:
Wingspan - 66 inches; Engine - .25, .30, .40; for 4 RC channels.
KIT INCLUDES: balsa, plywood, hardwood framework parts, complete illustrated assembly, RC installation and flying instructions. Vacuum formed canopy. Top quality hardware included - engine mount, aileron horns, pushrods for all controls, control horns, main landing gear and tailwheel struts, wheel collars, hinges, pushrod, servo connection hardware, wheels and fuel tank.

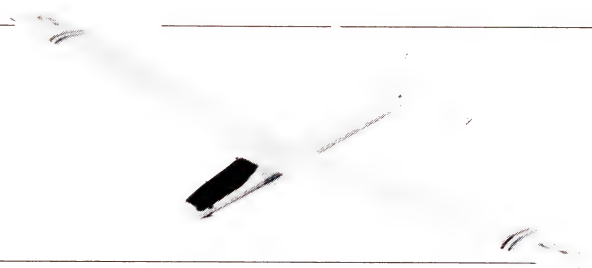
PRECEDENT-BI FLY 25

A super sport 36 inch span bi-plane. The balsa/ply fuselage and all balsa wings keep the weight down to 3½ lb. (1.6 kg), which gives Bi-Fly 25 sparkling performance on an economical .25 motor. All cabane wirework is preformed, and the kit includes a special jig to take the guesswork out of the upper wing alignment. RC accessories include: control cables, links and adjusters, cranks, horns, hinges and prop spinner. Quick and easy to build and a joy to fly.

PRECEDENT BI—FLY 40

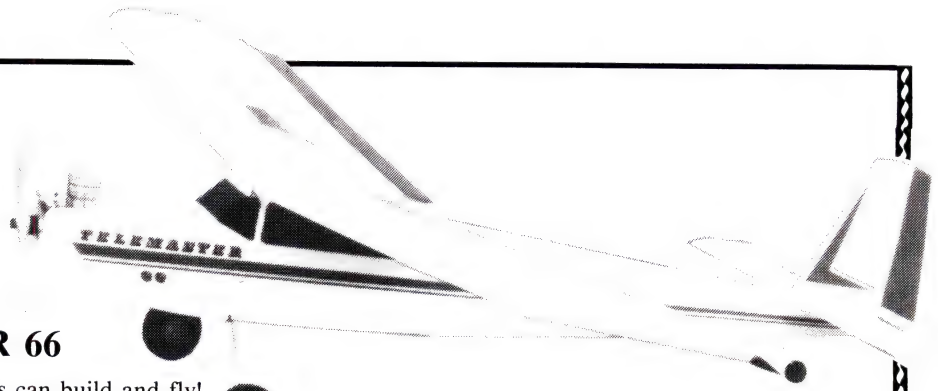
Ideal for 4-stroke motors, the Bi-Fly 40 has a 48 inch span and is ideal for .40 to .60 2-stroke or .60 4-stroke motors. Weight is only 6½ to 7¼ lb, depending on equipment used. Ready to join Obechi veneered foam wings with upper wing position jig. Preformed undercarriage and cabane wire. Slot together all ply fuselage for quick assembly and strength.





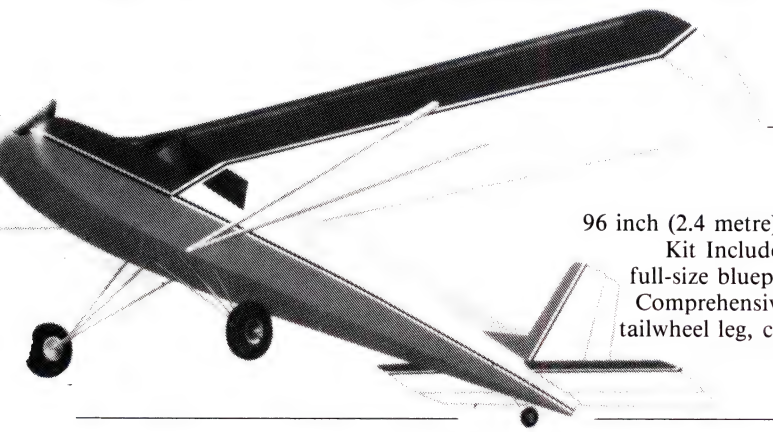
PRECEDENT HI-FLY

Now a Glider that slots together
- Nine plywood parts slot together to make the fuselage.
- Built-in servo holder makes RC installation easy.
- Easy to build balsa wings with hardwood spars.



PREMIER TELEMASTER 66

The world's best RC Trainer ..... Beginners can build and fly!
66 inch (1.675 metre) wingspan for 3 to 4 function RC and .19 to .40 engines.
Kit Includes: engine mount, aileron horns, pushrods for all controls, control horns, main landing gear and tailwheel struts, wheel collars, hinges, pushrod and servo connection hardware, wheels and tank.

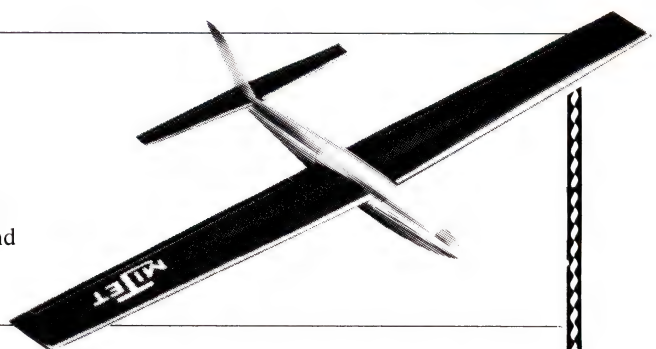


PREMIER TELEMASTER 96

96 inch (2.4 metre) wingspan for 4 to 5 function RC and .45 to .90 engines
Kit Includes: accurately die-cut balsa and ply parts, superbly drawn full-size blueprint plans, detailed instructions for step-by-step assembly. Comprehensive hardware pack contains: pre-formed undercarriage and tailwheel leg, control horns, nuts and bolts, wing struts, wing tubes and rods, aileron cranks, etc.

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PYLON ROUND-UP



The PDARCS team starting up during a heat of the NEC 3 Hour Enduro. Jim McKissack standing. Photo by Noel Parker.

by John Hughan

THE EFFECT OF PRESSURISATION ON ENGINE PERFORMANCE

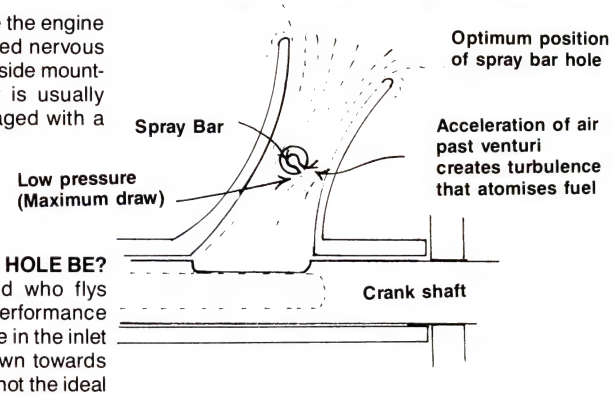
A few months ago I was calling for a mate in a Formula S event. He was running a Rossi 45, and was having trouble with fuel draw. This was evident when rounding No. 1 pylon, because the engine missed a few beats due to fuel starvation during the high g turn. To overcome this he decided to run his engine on crankcase pressure, which would give him about 4 lb per sq inch pressure in his tank, and force the fuel up to the carby. This worked OK, but he was unable to get a satisfactory idle. He resorted to runningt the engine at three quarters throttle, and was then able to get a reasonable idle.

The result of this was that the engine did not miss during the turns, but his times were very slow and he lost about 20 seconds during the race. The reason for this is simple: pressurisation does not improve the top end performance of an engine, and his ¾ throttle gave him only ¾ speed. Pressurisation is used only to ensure that fuel is delivered to the inlet venturi.

However, pressurisation will allow bigger venturis to be used, and with this, more air and fuel can be delivered to the engine. You can go overboard with this philosophy because, when the inlet hole gets too big, poor atomisation of the fuel results. This is due to the speed of the air being drawn in through the inlet venturi. The smaller the hole, the faster the air, the better the atomisation. If you have an engine with a good draw you can run a large hole in the inlet. As your engine goes over the hill, sometimes engine performance can be imnproved by reducing the size of the inlet.

I have not been one for large inlets; they seem to cause quite a few problems for, quite often, a very small increase in performance. With a Formula S engine I believe that it is not worth the trouble, not unless the inlet is very small, and then it would be better to install another make of carby. The OS is very good.

With our current high performance engines, pressurisation is a must. Usually this can simply be taken from the muffler, and this works very well. One way to improve fuel draw is to mount the engine sideways. This lowers the carby in relation to the fuel tank, and therefore the fuel draw is enhanced. In retrospect, I wish I had done this with my Hue-N-Cry design. The reason I didn't was because I wanted to have the engine right out of the way during high speed nervous landings during endurance racing. A side mounted engine means that the muffler is usually under the aircraft and can be damaged with a rough landing.



WHERE SHOULD THE SPRAY BAR HOLE BE?

I had a discussion with a friend who flys Formula S. He said that his engine performance was down because the spray bar hole in the inlet venturi was not pointing directly down towards the crank shaft. I told him that that is not the ideal place for it, but he went on detailing his reasons for wanting it there. I could see that he was not interested in my theory, so I did not persist. I now have a captive audience so I will explain what I mean.

As you can see from the diagram, if you have the hole at the bottom of the spray bar it is out of the stream of air flowing past the spray bar, so it is in almost still air. The best position is a compromise between maximum draw and maximum turbulence, and that is about 45° down from the horizontal axis of the spray bar towards the crank shaft. Why many engine manufacturers set up their spray holes incorrectly is a mystery.

HOW TO START IN PYLON

I received a letter from a young lad who showed some interest in ½A Pylon. He had a G-Mark 1 cc c.i. engine and requested information about a number of points relating to ½A. It was very hard for me to tell the boy that he is not, at this stage, ready to fly ½A aircraft. People look at the small airframes and get the impression that they are easy to fly. That is far from the truth.

The ½A models are possibly the most difficult of all the pylon classes to handle. This is mainly due to their size. Being small, they get thrown about quite considerably by the wind. It is a common sight at race meetings to see ½A models cartwheeling across the landing strip because they received a gust of wind just prior to touch-down. Going from a trainer into ½A would lead to heartbreak, and the possible loss of an aeromodeller for ever.

Prior to entering pylon racing, a person should first of all master a training type of aircraft. He should then fly free style sports aerobatics for a while. Basic manoeuvres such as inverted flight, multiple rolls, plenty of loops and stall turns and so on should be mastered. The next step is to build a Formula S model and fly in some Formula S events. The models are usually about the same size as FAI Pylon Racers with a wingspan of about 1½ metres. They are powered by a 45 sports type engine. With this aircraft you learn to fly pylon.

After some time of flying Formula S races, the modeller is then ready for ½A pylon. Once you have the ability to fly ½A you can fly any pylon racer you wish.

ENDURANCE RACING

In a previous issue I mentioned that there were a number of endurance races scheduled, the first of which was the NEC sponsored **Three Hour Endurance Race** run by Noel Parker at the Packenham Club. This event is for Formula S models over an FAI course. Change of pilot every 3 hours and battery change every hour. A team of 3 pilots and 2 helpers is required. This event was won by the Packenham Club; pilots Ashley McDonald, Mark French and Jason Walker, caller Peter Roberts. This was a very exciting event. Flying the same model for three hours was a lot of fun and a real test of endurance. Initially our team tried to pre-judge the lights at No. 1 pylon. This turned out to be a mistake, because it is impossible for the caller to keep up his concentration over such a long period, and the result was lots of cuts. This cost our team the race, as we were beaten by only one lap after having three

Join the MAAA;



Winners of the NEC Enduro conducted by the Pakenham club: Ashley McDonald and Jason Walker with their Rossi 45 powered OD model. And is that Mark French or Peter Roberts with them? Noel Parker took the pic.



Cliff McIvor of Hawthorn Hobbies doing some pit work in the NEC Enduro. Now we know who is No. 1! Parker photo.

more cuts than the Packenham team. Actually, we learned plenty from the experience, and will be better equipped next year. It gave me a chance to check out my new Hue-N-Cry design, and it behaved perfectly. There were a lot of comments about the model, and a large number of pilots are after the design.

Results

	Laps	Cuts	Gross Laps
1. Packenham (young ones)	821	23	798
2. Lilydale	823	26	797
3. PARCS	718	20	698
4. Sunbury_	605	21	587

100 Lap Saturn Hobbies Race

In this race 100 laps are flown with ten landings during the race. It was divided into Formula S and Open events. Formula S was won by Brian Steele flying a 45 ASP powered sports model. The model was not quick, but Brian's accurate flying achieved a record time of 26 minutes 45 seconds for the race. I entered my Hue-N-Cry in this but had a problem with the quick link coming off the throttle lever, which stopped me from landing. As a precautionary measure I fit a fixed pick-up in my fuel tanks, which is a soldered piece of copper tubing to the bottom of the metal tank, so all I have to do is invert the model and the engine will cut. I did this, landed the model and lost a lot of time adjusting the quick links.

I then decided to enter the Hue-N-Cry in the Open event, but strictly as a Formula S model; i.e. 10 x 6 prop and so on. During this race I experienced only one small problem and ended up with a time of 25 minutes 10 seconds, which is a race record. I believe that this time can be further reduced, and with my current set-up I am aiming for a 1:23 with the Hue-N-Cry next year. I am now running a Rossi 45 engine with a Bolly 10 x 6 fibreglass prop.

John Hughan, 92 Hawthory Road, Kilsyth, Vic., 3137.

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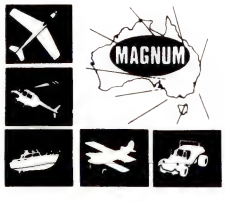
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The HUE-N-CRY

by John Hughan



Hue-N-Cry is retrieved by Jim Crenshaw after a race heat. Colours are yellow and red, with black trim.

INTRODUCTION

Do you want to build a thoroughbred model; one that has plenty of up-and-go; one that will pull 300 foot loops and is the best Fornmula S model around? Well, the Hue-N-Cry is for you.

Some years ago I started designing my own pylon models, and with these designs I won FAI and ½A Pylon and came second in QM at the Nats. When my son, Anthony, started to fly pylon, I decided to design a Formula S model for him because there was nothing around that I thought was ideal. There were plenty of fast models, but they were not much good in the turns. The owners thought they were great, but to me they appeared to be somewhat uncontrollable. What many newcomers fail to realise is that you win races in the turns. A good flying aircraft turns quickly and smoothly; it does not lose very much speed around number two or three pylons. This was very apparent to me when I flew this aircraft in the 3 hour endurance race. We flew against a team that had a very clean, stick-type model which was very fast. We had about the same straight line speed. When we entered pylons 2 and 3 together the Hue-N-Cry came out well ahead; it hardly lost any speed at all.

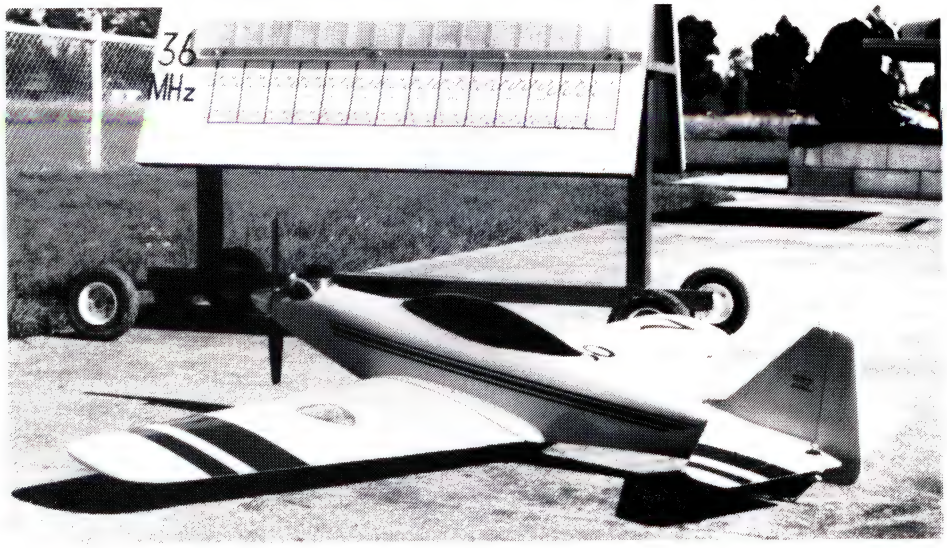
FEATURES

This design was originally put together for my son, and with it he won every Formula S contest over a 12 month period. Since that time I have kept an eye on what is being flown in Formula S and I have not been very impressed with anything I have seen. I do not like box fuselages, constant chord wings, engines sticking out from firewalls without any cowling whatsoever. All that creates drag.

What I am after is a model that:

- is not too large or too small;
- is streamlined;
- has a relatively deep fuselage to assist knife-edge flight in the turns;
- has a reasonable wing span and tapared wings, because they fly better in turns;
- has enough room in the fuselage to accommodate a big tank, for endurance racing;
- is made of balsa, because balsa is best and strongest, and is also very light;
- has a foam wing sheeted with balsa, because this type of wing is more efficient;
- has a semi-symmetrical aerofoil so that it can be used as a sports model and also fly aerobatics. It must be thick enough to provide lift at the speeds expected of a Formula S model;
- has a nose moment that will allow for the heavier type 45 engine that is now on the market, e.g. Picco and Rossi;
- has undercarrriage legs as short as possible to provide strength for the pounding of endurance racing;
- has moments suitable for a pylon model.

The Hue-N-Cry was designed that way, and its flying is perfect. It has no vices whatsoever when racing. Its full bore take-offs are a delight; up elevator and a tiny bit of right rudder and you are in the air within five feet. You can set the model up in knife-edge very early and it will stay there. This assists the turn at number one pylon.



Hue-N-Cry sits nicely on the tarmac. Construction uses essentially traditional materials and methods.

BUILDING

Fuselage

The model has a box-type construction fuselage which is built upside down on a flat board. It has a 2 mm ply lamination at the front of the fuselage to add strength. Balsa triangular pieces are added where shown on the plan so that you can remove balsa by sanding and planing to streamline the aircraft.

After the sides have been laminated and the balsa triangles fitted, the bulkheads are cut out. Attach the engine to the firewall. Assemble the fuselage upside down on a flat board. Set up the engine so that it has neither side nor down thrust, then glue the firewall in place and add gussets to strengthen it. Remove the engine and lightly tack the balsa block in position, except around the front cowl. Use very light (1 inch sheet) balsa. Shape the balsa block with a razor plane, then with rough and then fine sandpaper. Remove the balsa block and hollow it out with a Dremel or similar. Do this outside as there is a lot of dust. Replace the block on the fuselage and stick it permanently in place with Super Glue or White Glue. Do not use epoxy as it does not sand. Replace the engine, complete with spinner, plug up all the holes in it, and place small pieces of block in position to make up the cowl. Glue these permanently in place with Super Glue. Sand this to meet the contours of the fuselage. Remove the engine and complete the final sanding of the fuselage. Plug all the small dings and holes with filler. Run some fibreglass (¾ oz) cloth around the front cowl to add some strength there. Use sandable polyester resin. Sand this smooth when cured.

Wing

I suppose that quite a few people would like to try out a new wing section, but I believe that it would be foolish to do so, as this one has been proven to be an excellent performer and suits the model. You can either cut your own foam cores or get them from Lance Langham who will cut them for you. Phone him on (052) 75 3493.

I used 1/16 inch balsa for the sheeting and Pic laminating epoxy to stick the skins in place. I run a length of kevlar twine along the bottom skin on the inside surface. This is stuck in place with Super Glue, prior to skinning. This adds a lot of strength. The leading and trailing edges are added later. Block balsa is added to form the whole aileron assembly. The actual ailerons are then cut out of this block after the wing has been sanded and shaped. The strip aileron cranks are then added. The bearings are made up from a mixture of 5 minute epoxy and micro balloons. Just put everything in place, grease the crank wires and, just prior to the epoxy setting, give the crank a turn and keep doing so until the epoxy hardens and you have a perfect bearing that will not rust or corrode. Fill in around this bearing with balsa and sand it smooth to suit the wing.

I used a torsion bar type of undercarriage so that I could use 5/32 wire legs. The base for this was made up from 1/8 ply and stuck together with Super Glue. I then cut a hole in the wing to suit this undercarriage assembly, right up to the top wing skin, but not through it. I then filled this hole with balsa block so that the undercarriage has a solid base. The whole assembly was then epoxied into place.

The two wing halves are then joined. I use 5 minute epoxy for this, but I make sure that the wing is jigged to ensure that both sides of the wing are at the same angle of incidence. Do not build a twist into the wing. This is a very important stage of building and must be done accurately. Re-inforce the centre section of the wing with fibreglass. Make sure that the top of the wing, directly over the undercarriage, is fibreglassed, otherwise the undercarriage will push through the wing during a heavy landing.

ASSEMBLY

Fix the wing onto the fuselage, then add the tailplane. Check that this is level with the wing also for a 0° incidence result. Add the fin and rudder.

Cut out the wing fairing shape from 2 mm ply. Pinch between the fuselage and wing and tighten up the wing. Secure with epoxy and small balsa blocks. Fill in the rest with a mixture of polyester resin and micro balloons. You may have to prime the surface first with polyester resin and add the balloon mix to the wet surface. You must mix in enough balloons so that it will not run. After it cures sand to a nice fillett.

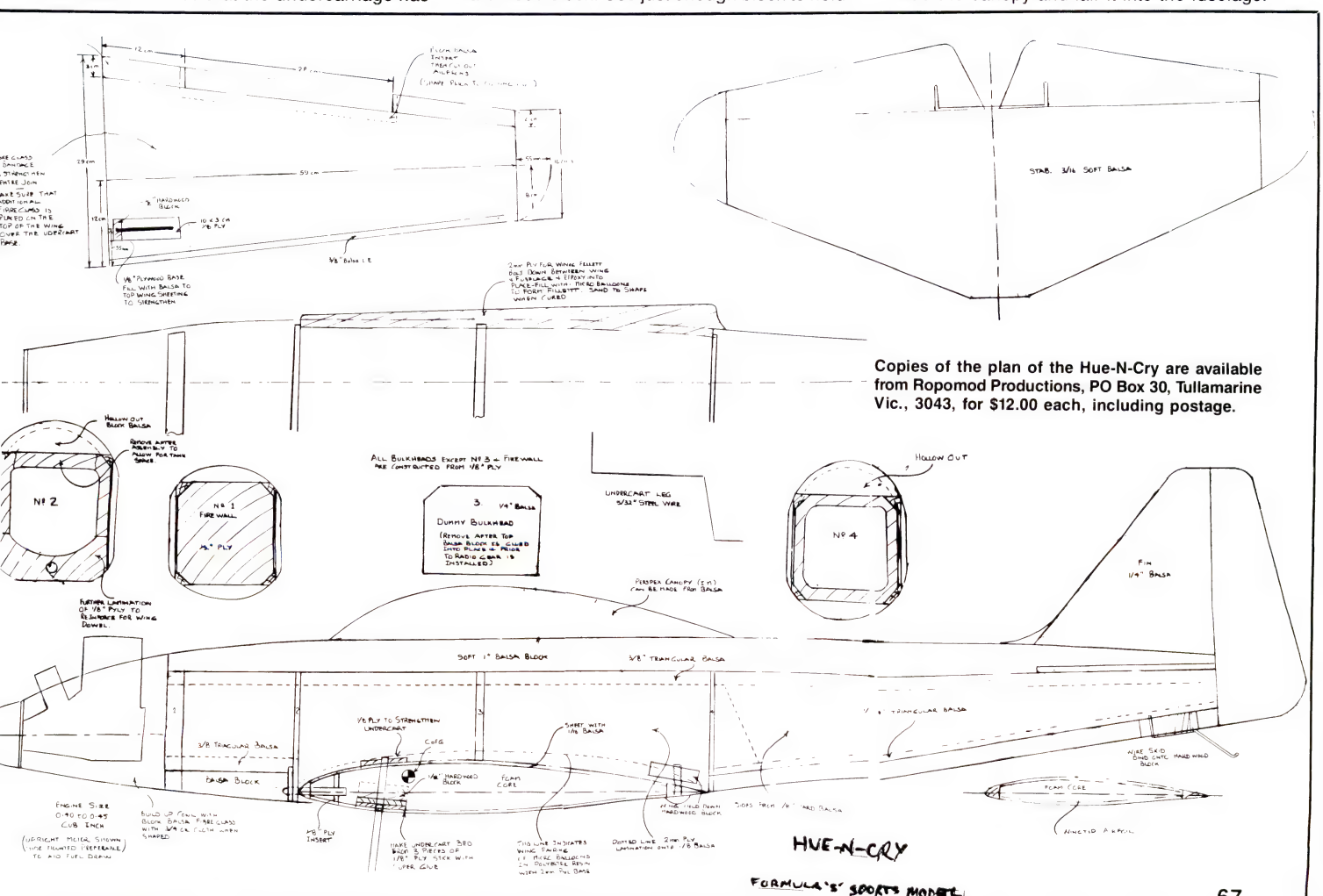
Install the radio gear. If a heavy motor, such as a Rossi 45 or Picco, is used, position the radio well back in the fuselage hatch. This allows plenty of space for a big fuel tank, which is needed for endurance racing.

Add the wing skirt assembly. Make this out of hard wood block. Use just enough block to hold the wire. Keep it as thin as possible and bind it with cotton. Cut a slot in the end of the fuselage. Secure with epoxy and fill with micro balloon mix.

Add the canopy and fair it into the fuselage.



Thomas Allen with the Hue-N-Cry displaying the proportions and pleasing lines of this new design.



Copies of the plan of the Hue-N-Cry are available from Ropomod Productions, PO Box 30, Tullamarine Vic., 3043, for $12.00 each, including postage.

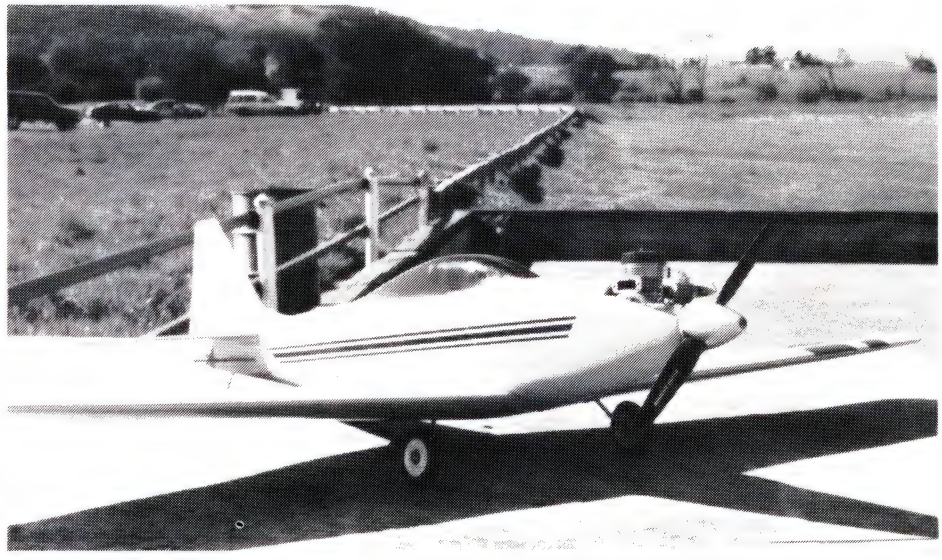
FINISHING

Give all the surfaces two coats of dope, leaving to dry overnight and sanding between coats. Cover all the surfaces with lightweight tissue. Don't worry about the creases on the fuselage. Sand smooth with 400 grit; all the creases will then disappear. Give 2 more coats of dope with talcum powder added. Sand between coats, leaving overnight to dry. Finish with an undercoat primer and finishing paint. This is the lightest finish that I know. It is lighter than shrink film, and more permanent.

FLYING

You should not have any problems with flying. The model has rather short moments and therefore does not like taxiing, as the rudder is very sensitive. It does, however, love full bore take-offs. Mine does, anyway.

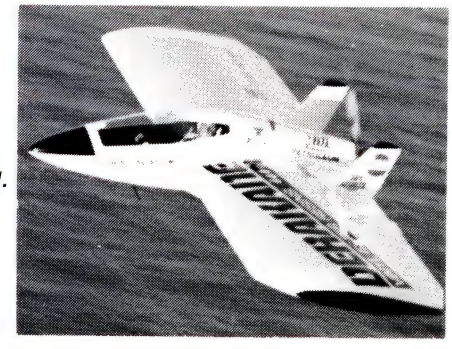
This model costs very little to build. Balsa construction is a lot cheaper than fibreglass kits. As you can see, I have not skimped in any way, and the result is a very strong model that weighs 2 kg, even with a heavy Rossi 45 and a big 18 oz tin tank; and that is not heavy.



All features of the Hue-N-Cry have been race proven. Combination of the best ideas of other racers has yielded a top performer.

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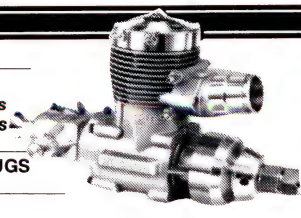
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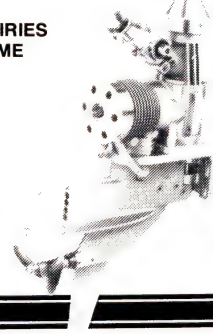
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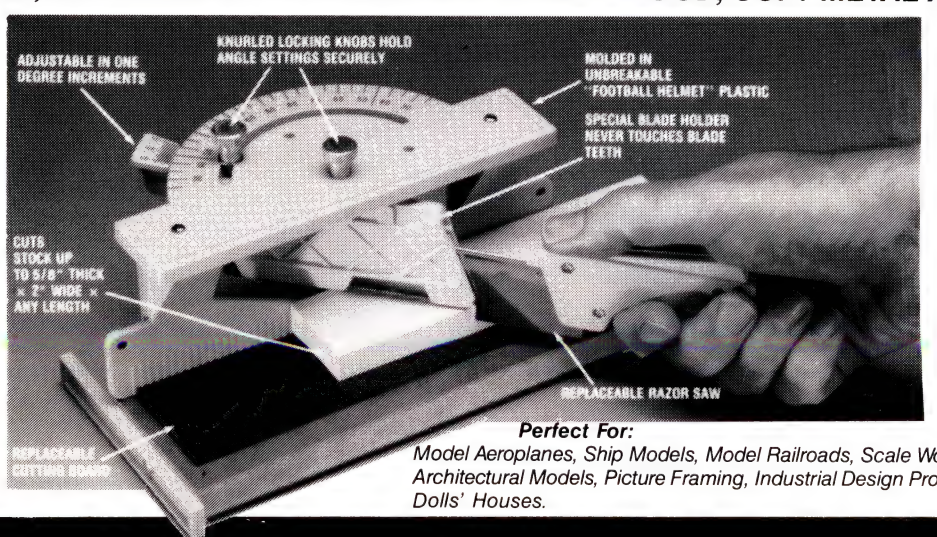
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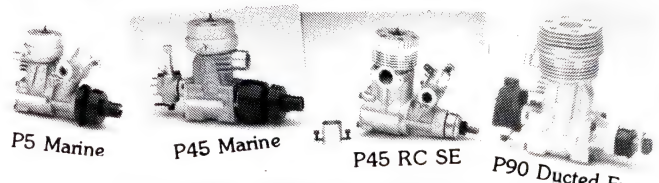
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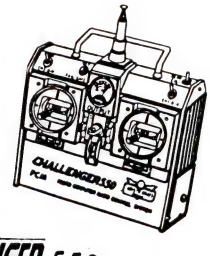
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TO BEAM ERLODEL

EPISODE 5

by Vin Masters

REVISION

Workbench, tools, terminology, techniques and safety have been dealt with so far. All those topics are open-ended, in that there is no apparent limit to the information that they cover. There are more topics to be added to the list, so from now on revision will be your task. Actually, it may not be necessary, providing that you have used the information given and practised the ideas involved. Soon you will select the materials, methods and techniques that suit your field of modelling. BUT REMEMBER THAT VALUABLE IDEAS CAN BE FOUND IN OTHER BRANCHES OF MODELLING. Read all you can: don't get tunnel vision!

TOOLING UP

Modellers are sculptors. Sculptors carve things from solid pieces of material. Carving techniques require sharp knives and chisels. To carve balsa and softwoods a good hunting knife is an excellent tool. The best sort has a long, straight section on the sharp edge from the haft till the tip curve begins. Sharpen it frequently and carefully on a good oil stone. For cutting plywood the Stanley knife is the best. Stanley blades can be sharpened on the same oil stone.

SAFETY

When carving or cutting with a knife, slice the material away from your hand. Switch the material end for end to get the best direction of the grain to avoid the blade digging in and getting stuck, or causing it to split.

TECHNIQUES

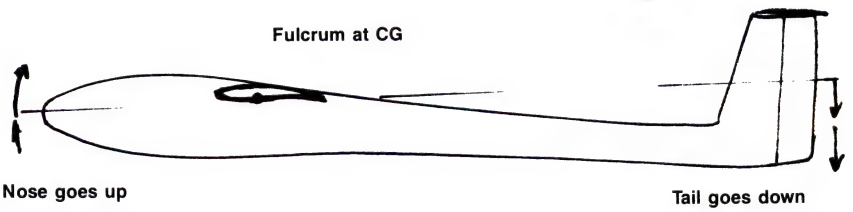
Re-read the above paragraph.

When cutting plywood for wing rib templates or for fuselage formers, pin the ply to a cutting board so that the item is fully supported along the cutting edge. It is easier to hold a cutting board than the rib or former, which is usually much smaller than the board. For thick ply use a saw.

Now, here is a new topic, introduced by Don Howie, as part of his going-it-alone discussion that began in Episode 3.

AERODYNAMICS

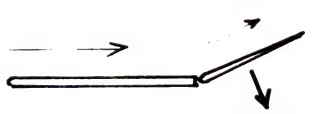
I must admit that I read Ron Warrinng's articles when I was a boy, and I expect that Martin Simons did also; perhaps he understood it all, but I soon lost interest. Martin is a member of the same club as I am (when he flies power models) and I hope he will forgive me for over-simplification.



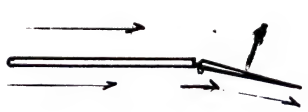
Imagine that the aircraft is a lever and that the fulcrum is the centre of gravity. Next we must refer to one of Newton's Laws (it's a long time since I was at school). It is basically that a change of direction of a moving body (in this case air) results in an equal and opposite force. If we put the elevator up, which deflects the air upwards, we will get an equal and opposite down force. Working on the centre of gravity fulcrum, this results in the tail going downwards and the nose up. If we put the elevators down, the air is deflected downwards and the equal and opposite force is upwards, which points the nose down. The same forces apply to the rudder or the ailerons if fitted; the rudder pushes the nose to left or right and the ailerons roll the aircraft.



No elevator deflection: airflow straight



Elevator up: tail pushed down

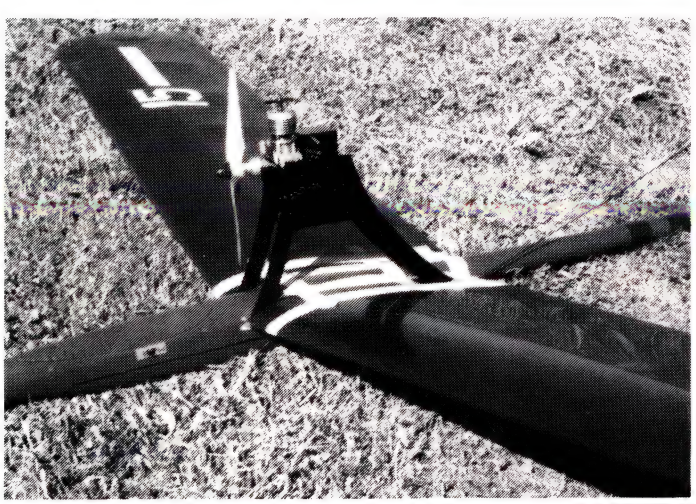


Elevator down: air deflected down, tail lifted up.

ALTERNATIVES AND PROGRESS

The powered soarer approach to learninmg to fly should be successful for any newcomer, particularly with an instructor, but it may not appeal to some. Since it is normal for an aircraft to take off from the ground, this feature may be expected by a new pilot, rather than the hand launch style. I would recommend a simple Old Timer, such as the Simplex or Brigadier, powered with a 1.5 cc diesel as the next model, or even as the first model when learning to fly. The Silver Swallow has plenty of power with a Graupner 8 x 5 prop. It is important to get good diesel fuel and this is now availabvle from Aerial Advantage, as well as some local control line flyers.

The Cox 049 motors are adequate for light, well-built models up to 1.8 metres wingspan, but they need special propellers and high nitro content fuel. To go it alone the beginner must have the simplest model. The Simplex is particularly good because the structure has no difficult parts, so the risk of bad alignment is low. This design (the plan is available from Airborne) will cope with engines up to 3.5 cc. I used an Enya 19 in one, and with a small metal tank located close behind it the engine gave faultless running. The fuel tank should not be any distance behind,



Oliver Tiger Cub 1.5 cc diesel on a strong power pod. A good combination by Ian Prommitz, but the large engine, prop and mount are rather ungainly. Another Howie pic.

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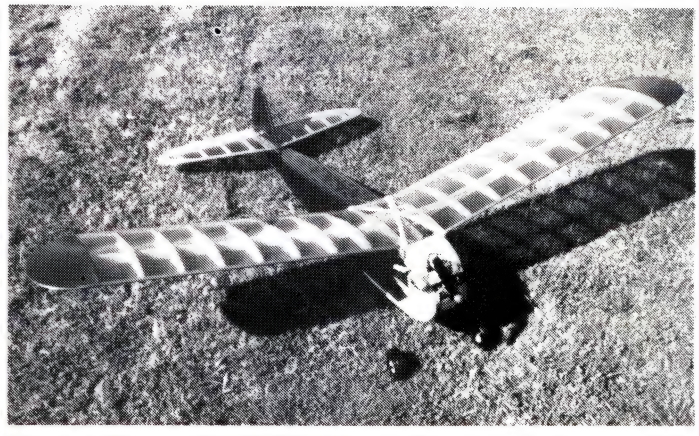
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Another Simplex, this one by Don Scraggs, has Enya 19. Transparent covering, narrow style undercarriage and balsa-only spar in wing. See text for comments on these features. Howie photo.

Our instructor and his OS 20 FS powered Simplex. An ideal beginners model. The right size, easy to build, easy to fly and easy to repair. Only 2 function radio needed, but throttle control makes it easier.

above or below the engine. Standard glo fuel was quite satisfactory for running and without any nitromethane is easier and cheaper for lone modellers to make. It may need a shake before each flying session, and it should not be left in an unsealed container at any time, because the methanol attracts water, causing difficult starting and poor running.

Firstly I will describe the mods necessary to the Simplex design; the kit version and the plan version from Airborne. Both models I have flown have suffered the same fate — wing folding. The other problem is the short nose moment, which will require lead in the nose to get the centre of gravvity in the right spot. On the plan version, which is OK for free flight (as designed) it is necessary to increase positive incidence on the tailplane by 3 mm. Also, place a piece of 1.5 mm ply vertically in the tail skid to stop this from breaking off. The major alteration, however, is ply re-inforcement to the main and only spar in the wing. Use 1.5 or 2 mm ply to the depth of the spar, ¾ inch as shown on the plan, and extend this to ½ of the span of the wing on one side of the spar and for ¼ of the span on the other side. Glue this with white glue (Aquadhere) to the balsa spar and you will not have any problems. The tailplane needs to be light balsa to reduce the amount of lead in the nose. The leading edge of the wing should be ¼ inch square hardwood and not balsa.



Brigadier Old Timer with Silver Swallow 1.5 cc diesel. Small metal fuel tank is immediately behind the engine. Another simple, safe model by Don Howie. A third servo squeezes fuel tubing to shut off motor in an emergency.

On the kit version, the undercarriage is too narrow, but can be easily widened and still give plenty of prop clearance.

I have found that transparent Solarfilm, Econokote or equivalent is ideal for covering the wings and tailplane. If you give the tips, leading and trailing edges and centre section a coat of Balsarite, the iron-on film will not lift in the hot weather. The iron-on film shrinks readily (unlike Micafilm and Litespan) and warps are easily removed with a hot iron (twist the opposity way).

Radio Installation

This is the part where modellers going it alone may get it wrong. Firstly the servos and battery need to be well forward to ensure that the model is not tail heavy. The receiver is best wrapped with natural latex rubber (obtained from a rubber store near a large hospital). Always place the battery at the front (standard 550 mAH pack), as this is the heaviest component and can help get the CG in the right spot. If you are going it alone with your Old Timer you should reduce control movement by using the holes as close in on the servo arms as possible. The aim is to make gradual turns and the elevator should not need more than about 6 mm up and 6 mm down for a start. It is best to remember that you are flying a free flight model which needs very little interference and, once trimmed, will need controls only to bring it back or near to where you are standing.

Motor Installation

Most beginners fit far too large a tank. They seem to think that they will be needing a half hour engine run. In most Old Timers, three minutes on full throttle will take the model out of sight! Once a reasonable height is obtained, it is best to throttle back or even cut the motor, as controls are less sensitive on the glide. A small free flight tank (made by Aeroflyte) is all that is needed with an OS 20 four-stroke, and a couple of climbs and glides will give a 15 minute flight.

Another problem with beginners is getting linear throttle response with the motor. You should measure the total throttle movement with the idle screw slightly screwed out so that the motor can be stopped if necessary. Once the amount of movement is known it can then be related to the holes in the servo arm movement, and a correct arm selected that will give just this amount of movement. It is simple, basic but precise things that make all the difference. It is assumed that you do not own a Computer Radio, but rather a basic 4 or 5 channel model.

Flying

When going it alone it is best to trim the model as you would a free flight model. Test glide into the wind; slight breeze or no wind is best, and try to launch at the estimated flying speed. Have the radio switched on, and elevator control or trim should be the only control needed at this time. A slight turn can be adjusted, but check for warps and lateral balance first. Most low powered models benefit from some right side thrust to counteract the torque of the motor. Run the motor and check throttle response on the ground. I think hand launches are best for beginners' Old Timer models. Run the motor at full throttle, but slightly on the rich side. It should be possible to fly the model single handed; i.e. without a helper, but I always fly with at least one other person around in case of an accident. Many people have had their fingers, hands and legs cut by a spinning propeller (the writer included) so you have someone about to drive you to the doctor if necessary.

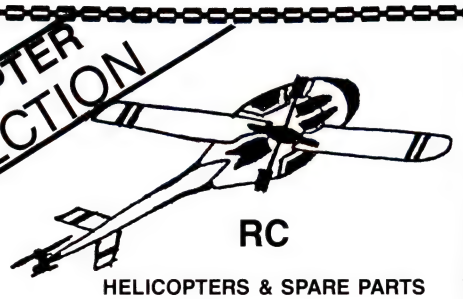
After launching slightly upwards into a slight breeze, watch the model and see what it does. It it turns or climbs rapidly it is best to reduce throttle to almost half and see if this cures the problem. If it is turning left, some right trim can be put on the aileron stick (aileron stick is used to control the rudder in non-aileron models) until the model is flying straight. Do not allow the model to get too high or too far away. Reduce throttle and try and steer the model towards you. If you use one control at a time you should not become confused and will get the model down in one piece.

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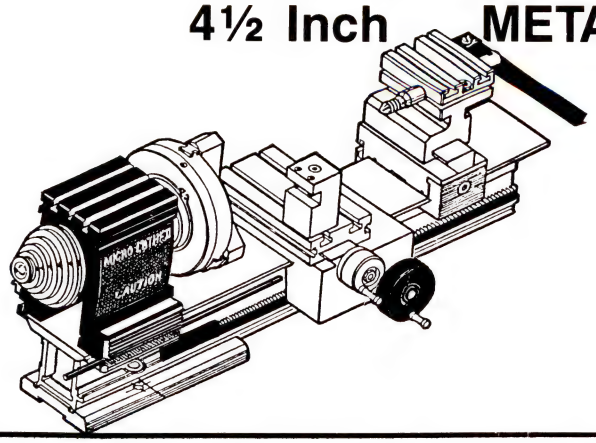
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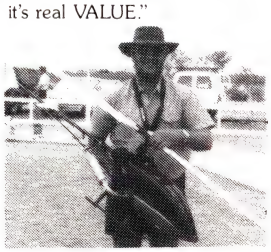
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Rob Barbuto (right) 1st place '89 Nats; Geoff Woodward (left) 2nd.

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ROTOR ROUNDABOUT

BY MAX TANDY..

1990 VIC STATE CHAMPS

from Ian Anderson

The venue for this event was the field of the Melbourne RC Helicopter Club Inc., which is in Chelsea, an outer suburb of Melbourne. The date was Sunday 19 March, and the three categories run were F3C, Intermediate and Novice. I was Contest Director, and the five judges were Marcia Merrifield, Marvin Carr, Nick Csabafy, Keith Feldman and Graham Smith. The weather was overcast with a strong northerly wind.

In the **F3C** event it became obvious after the first round that John Wessel was out for a victory, as his handling of his X-Cell Quicksilver was immaculate. This is the same helicopter that John flew at the World Champs in the USA last year. John was only marginally ahead of Rob Barbuto, also flying an X-Cell. The final results of the three events were as follows:

F3C

1. John Wessel	X-Cell	JR PCM 10
2. Rob Barbuto	X-Cell	Futaba 1024
3. Paul Dewar	Heim Lockheed	JR PCM 10

Intermediate

1. Scott Lennon	Schluter Champion	JR PCM 10
2. Steve Green	X-Cell	JR PCM
3. Ray Pike	Schluter Champion	JR Max

Novice

1. Danny Hill	Concept 30	Futaba Gold
2. Don Relf	Concept 30	
3. Ken Wilkins	Concept 30	

The Novice event was extremely close, with the winner being decided in the final round. The events held at these titles are the events that will be run at the Australian Nationals in Bendigo at the end of this year. Anyone who would like information on the manoeuvres for the Intermediate and Novice events should contact Ian Anderson on (03) 807 1017, or write to him at PO Box 242, Chelsea, Vic., 3192.

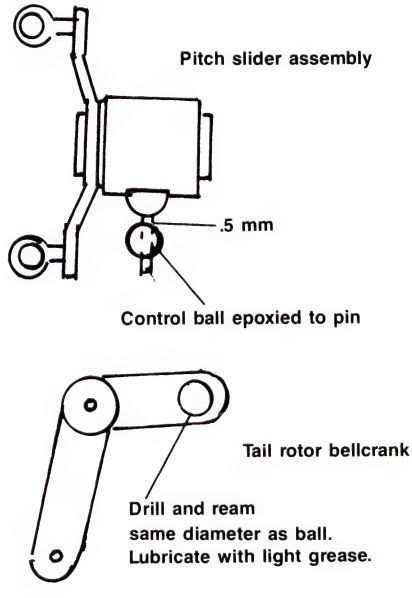
A MOD FOR THE CONCEPT 30

from Cliff Hiatt, USA

This was received in a recent letter, and will be of interest to owners of this helisopter. It concerns a rapid-wearing item in the tail control. Cliff writes:

"The enclosed is a sketch of a modification for the Concept 30 tail rotor control. The reason for this mod is to increase the life of the tail rotor bellcrank and to improve the control and general behaviour of the tail. The reason the bellcrank wears so rapidly is that, as the bellcrank moves the slider the pin in the slider travels in an arc and wears the bellcrank and pin. The ball system modification permits angular motion of the pin, and consequently it does not wear." See the sketch for details.

KYOSHO CONCEPT 30 PITCH SLIDER MOD





F3C placegetters at the Victorian Titles: Rob Barbuto, John Wessels and Paul Dewar. Three different machines.

IMPROVING THE M.F.A. SPORT 500

Numerous phone calls from owners of the Sport 500 helicopter concerning the apparent lack of tail control left me wondering about the possible source of the problem. In all cases the callers were new to model helicopters, and the symptoms were the same; that is, the helicopter would spin around when an attempt was made to take off, even with full tail control applied in the appropriate direction. The possible causes that I was offering were the usual ones that beginners sometimes experience, such as the gyro being selected the worng way or the tail control in the opposite sense, and maybe the tail drive side slipping. However, none of the cures for these causes were working. Also, the helicopter was always turning to the LEFT, with the natural torque. It seemed fairly clear that the tail rotor was not doing its job. At this stage I had not seen the Sport 500 and had not been associated with them at all.

It was not until a gentleman engaged my services to make his Sport 500 fly that things began to fall into place with the enquiries I had received. Any attempt to lift this helicopter into the air resulted in the nose swinging to the left, and no amount of tail correction to the right would prevent it from turning. So, back to the workshop!

The gentleman assured me that it was assembled according to the instructions, however, I still began a thorough check of the tail rotor section. It LOOKED all right until I pulled outwards on the tail blades to simulate the in-flight load on them. To my surprise they moved about 5 mm outwards while being restrained by the pitch blade. Normally there is no movement there at all. As the tail blade moved outwards, which it would under normal flying conditions, it was also being TURNED by the action of the distorting pitch plate, and yes, you guessed it, turning the blade back to zero pitch. We had found the cause of the nose always turning to the left, but what was wrong with the assembly?

We went back to the Instruction Book and checked the method of assembling this section, which said in the text, and showed in the illustration, a 12 mm long slotted head screw attaching the blade holder firmly against the hub and operated nornmally. The bolts (2) supplied in this kit, and the next kit we checked, were 19 mm long and had no slot of any kind in the end for tightening. We thought that this was most odd! With the bolts supplied screwed into the hub until they were firm, they actually protruded by different amounts! The unfortunate part about this is that, someone not familiar with model helicopters would not realise the significance of the longer bolt. The helicopter would not fly. Of course, at this point we replaced the strange bolts with the correct type. We have included a photo of the tail blade assembly fitted with the long screws as supplied, and not 12 mm as called for in the instructions.

Having corrected this situation, we proceeded to have another go at hovering the Sport 500. This time the tail was able to be held with the controls, however, it required more input (a lot more) than other types of helicopters. While hovering the heli close up we were able to watch the input corrections to the tail and see what was



Intermediate placegetters at the Victorian State Helicopter Contest. Steve Green, Scott Lennon and Ray Pike. See results for details. Two plus one!



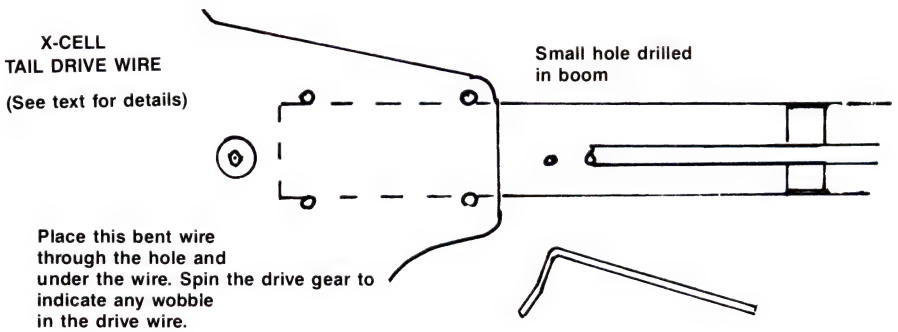
Novice placegetters at the Victorian State Heli Titles: Don Relf, Danny Hill and Ken Wilkins. Three of a kind!

happening. The tail servo was pushing the tail control cable, but the cable was buckling up at the tail bellcrank as it went through the curve. Since we experienced this I have read an article in an English magazine which made a comment that this cable bends close to the tail bellcrank and significantly reduces the right tail authority. We tried for some time to come up with a fix for this, however, we abandoned the idea in favour of flying it as it was. If anyone who has experienced this problem has come up with a simple solution, we would love to hear from you so that we can pass it on to other owners of the Sport 500.

Another small point that we were able to improve on our particular model was the balance of the flywheel. From new this machine had a vibration, the cause of which was difficult to find, and after a couple of hours of operation the main aluminium plate that the engine is bolted to developed a large crack. This, fortunately, led us to the source of the mystery vibe. The flywheel, which would normally have a ¼ inch hole for attaching to 40 size engine crankshaft, had a slightly larger hole, which prevented the flywheel from centering accurately. Another flywheel was obtained, however, it also had a large hole, so the fix was done by having the original one bushed and bored out to ¼ inch on a metal-turning lathe. Having it bored on a lathe rather tha re-drilling the flywheel ensured that it would run exactly on centre. This eliminated the vibration.

X-CELL UPDATES AND ASSEMBLY TIPS

The first tip concerns the **accurate alignment of the tail drive wire,** and it is simple and effective. As the front two m4 grub screws are tightened, the order in which they are tightened can affact the true running of the wire. More recent instructions suggest drilling a small hole in the underside of the tail boom at the front to enable a torch to be shone to see the wire while it is turning and correct by changing the pressure on either grub screw to achieve the true running. The accompanying sketch shows an even better way of indicating run-out of the wire within the boom, which can usually be corrected by slightly loosening the grub screw on one side and tightening the one on the opposite side. It makes it very easy if you put a dab of correction ink on one side first so that you know which side you are working on.



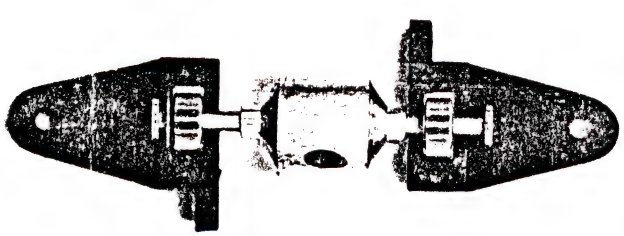
When **covering** the main rotor blade, a nice sharp trailing edge seems to make a difference to blade performance, particularly in auto-rotation. A simple method of achieving this is to lightly sand the back edge of the blades AFTER the covering is applied. This thins out the vinyl covering at the point where it has to fold sharply around the trailing edge and prevents it from lifting at a later time. It certainly looks a lot better, and people may comment on your good covering job!

Up-date Items that the manufacturers of the X-Cell kits are now including as standard are as follows:

Delta 3 type main blade holders - 60 kit only;
Tail gearbox case with extra case assembly bracket;
4 tail drive support bushes with a longer brass inner tube;
New type tail drive pinion gear;
Adjustable ball bearing swash plate.
(The bearing itself is adjustable.)

The new **X-Cell Triumph** is due for release in June or July this year and is a full body, 60 size, ready-built machine. Its white gel coated epoxy body requires only the pressure sensitive colour trim sheets applied to complete the body. It also accepts four-stroke engines.

Contributions to this column are always appreciated, and we thank the people who take the time to send them to us. Photos of your activities will also be included (if you wish), and should be either black and white or clear colour shots having good contrast. If you would like a particular subject relating to RC helicopters explained or discussed in this column, write to **Max Tandy, 9 Smailes Road, Jimboomba, Qld., 4280.** In today's mail we received an article from Steve Green in Leongatha showing us drawings and photos of his 'patent' Clutch Aligning Tool, together with an explanation of how he uses it. It is very simple and effective. We will be including all the details in the next issue of Airborne.



MFA Sport 500

Tail Blade Assembly

(See text for details.)

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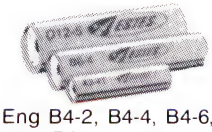
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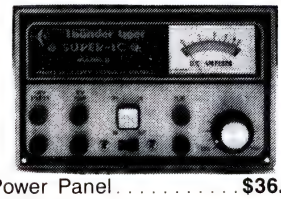


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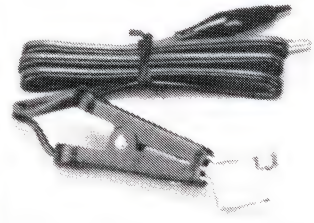
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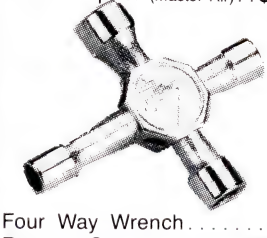
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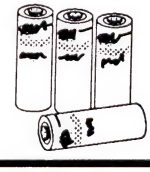
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10 x OS Number 8..... **$49.99**
10 x Taipan Yellow or Red. **$32.00**

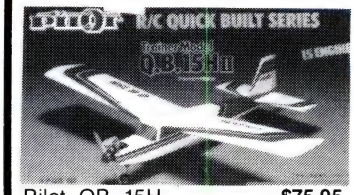
NICADS

AA Saft 500mAh..... **$2.99**

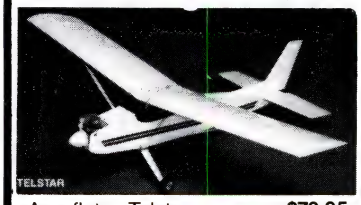


KITS

TRAINERS



Pilot QB 15H..... **$75.95**
Pilot QB 25H..... **$79.95**



Aeroflyte Telstar..... **$79.95**
Aeroflyte Hustler..... **$89.99**
Cosmo 25..... **$69.95**



Cosmo Dandy..... **$79.95**
Cosmo King..... **$79.95**
Telemaster 66..... **$89.95**
Telemaster 96..... **$189.95**
Bi-Fly 25..... **$105.00**
Bi-Fly 40..... **$159.00**

SPORT/SEMI SCALE

Aeroflyte Gemini 40/45. **$139.95**



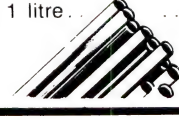
Pilot P51, ME109, Spitfire, FW 190..... **$199.95**
Pilot Cessna 152, 177.. **$169.95**
Pilot Tiger Moth (25)... **$210.00**
Pilot Tiger Moth (40/45). **$299.95**
Pilot Tiger Moth (120 FS) **$629.00**

SIG Astro Hog..... **$207.00**
SIG Kavalier..... **$198.00**
SIG Colt..... **$89.95**
SIG Piper J3 Cub (¼).. **$393.00**
SIG Piper J3 Cub (⅛).. **$199.95**
SIG P51 Mustang (WW2). **$239.95**
SIG Smith Mini Plane.. **$194.00**
SIG Mustang 450 Pylon **$164.00**

COVERING

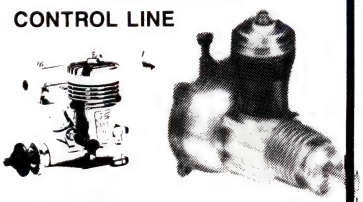
(All Colours)

Solarfilm..... **$7.89**
Solarspan..... **$10.50**
Dope, 1 litre..... **$8.99**



MOTORS

CONTROL LINE



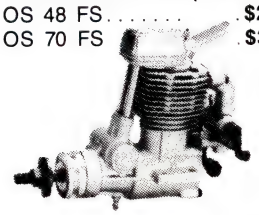
Cox .049 . . . . . $45.00
OS 10 FP-S (1.5 cc) $59.95
OS 15 FP-S (2.5 cc) $73.95
OS 20 STD (3.5 cc) $85.00

RADIO CONTROL (2-Stroke)

OS 10 FP $69.95
OS 15 FP $76.00
OS 25 FP $78.95
OS 40 FP (New Motor) . . $89.99
OS 46 SF $210.00
OS 61 SF $253.95

RADIO CONTROL (4-Stroke)

OS 48 FS $279.95
OS 70 FS $318.00

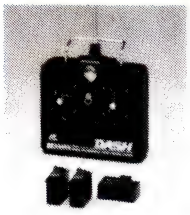


OS 91 FS $379.95
OS 120 FS $548.95
K&B 21 Outboard (Marine) . . $229.00

RADIOS

SANWA

Dash R2; 2 Servos, Reversing $99.95
Vanguard;
4 Ch, 3 Servo, AM, Dry . . . $259.00
Spectra 7;
4 Servos, FM, Nicads $879.00
Space 6 Ch Computer, Ni-Cads and Charger $549.00



HI-TEC (All with Nicads, FM)

4 Ch, PCM, 3 Servos $319.00
5 Ch, PCM, 4 Servos $398.00
7 Ch, 4 Servos $419.00
(Mode 1 or 2 on 7 channel)

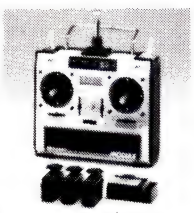


FUTABA

2 Channel Attack $105.00
4 Channel Attack;
3 Servos, 29 Mhz AM . . $229.00



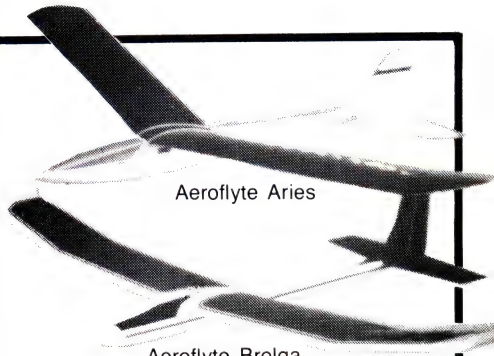




WHEELS (T.T.)

35 mm (2) $4.50
40 mm (2) $4.75
45 mm (2) $4.80
50 mm (2) $4.95
57 mm (2) $5.50
64 mm (2) $6.50
70 mm (2) $6.95
76 mm (2) $7.50
83 mm (2) $8.30
89 mm (2) $9.50





Aeroflyte Aries

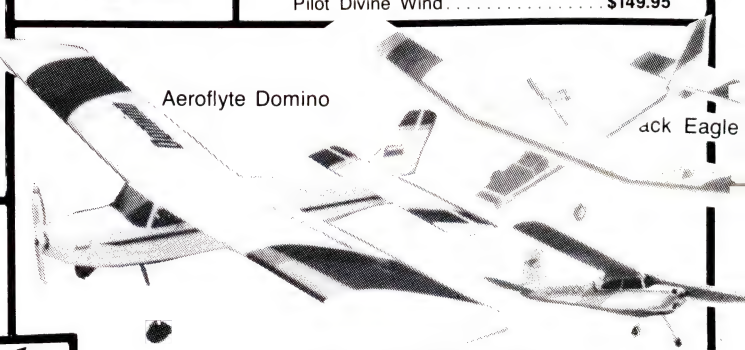
Aeroflyte Brolga



Pilot QB 180

RC GLIDERS

	Deal	Kit
Aeroflyte Aries; 1.6 metre	$136.00	$65.00
Aeroflyte Brolga; 2 metre	$158.00	$69.95
Aeroflyte Albatross; 2.5 m	$176.00	$89.95
Carl Goldberg Gentle Lady; 2 metre	$175.00	$75.00
SIG Riser; 2 metre	$199.00	$108.00
Pilot QB 1800		$119.95
Pilot Divine Wind		$149.95



Aeroflyte Domino

ack Eagle

FREE FLIGHT

Large range Telco, Peck Polymer, Keil Kraft, Guillows, Aeroflyte. Tissue, props, rubber, wheels.

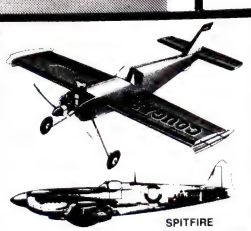


CONTROL LINE

	Kit	Deal
Aeroflyte Cougar 1.5 cc	$29.95	$49.95
Aeroflyte Mustang 1.5 cc	$34.95	$54.95
Aeroflyte Cherokee 2.5 cc	$39.95	$59.95
Aeroflyte Spitfire 2.5 cc	$39.95	$59.95
Cox PT 19	$89.95	$109.95
Cox Super Sport .049	$99.95	$119.95
Cox Chipmunk	$109.95	$129.95
Cox Airwolf Helicopter	$79.95	$99.95
Cox Bell Huey	$99.95	$129.95

Deal Includes:
Fuel, Battery, Wire, Clip and Filler Bottle



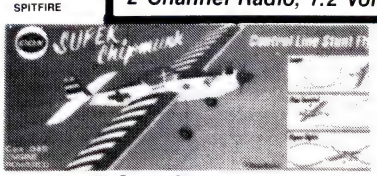


ELECTRIC FLIGHT

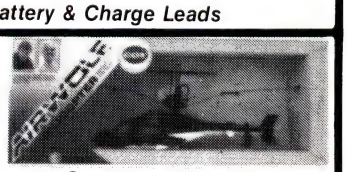
Union Champion

	Package	Kit
Aeroflyte Domino	$286.45	$149.95
Black Eagle	$286.45	$149.95
Union Challenger	$289.95	$189.95
Union Champion	$325.95	$225.95

Package Deal includes:
2 Channel Radio, 7.2 Volt Battery & Charge Leads



Cox Chipmunk



Cox Airwolf Helicopter

MAIL ORDER FORM **Minimum Freight $3.70; Motors, Radios and Kits $5.70 Insurance available $1 per $100**

Qty.	Description	Price	Total

Money Order Enclosed ☐ or please charge my BankCard ☐ MasterCard ☐ Visa ☐ No personal cheques. Min credit card purchase $10

Card Number | | | | | | | | | | | | | | | | | Exp. Date...../.....

Card Holders Name:..... Card Holders Signature:.....

Please send to:.....

.....P/Code.....Card Holders Phone No.....

MEMBER OF THE FEDERATION AERONAUTIQUE INTERNATIONALE
Patron: Air Chief Marshal, Sir Neville McNamara, KBE, AFC, AE

MAAA NEWS

MODEL AERONAUTICAL ASSOCIATION OF AUSTRALIA INCORPORATED

President: David Axon
Technical Secretary: Ron Ericson
Secretrary-Treasurer: Chris Greenwood
6 Coppelius Close,
Sunbury, Vic., 3429
MAAA Phone No: (03) 744 5915

Affiliations.

As at the end of April 1990, affiliations by States and Terrirories were: MAAQ 1216; RCAS(NSW) 2026; NSWFFS 66; CLAS(NSW) 100; ACTAA 142; VMAA 2208; TMAA 155; SAAA 577; AWA 527; and NTMAA 66; for a total of 7083. In the first week of May additional affiliations for 1989-90 have been received as follows: MAAQ 4; RCAS(NSW) 11; NSWFFS 3; CLAS(NSW) 4; ACTAA 11; and VMAA 2; giving a total of 7122. This is the largest number of members of the Association to date.

Of concern, and I wrote similarly last year, is that some of the forms from the clubs were dated February and March 1990 and yet they listed persons who were members last year. The Association's membership year runs from 1st July to 30th June. As at the 30th June your membership lapses, and with it your public liability insurance cover. As is common with other groups, we allow a few weeks for the club secretaries and state association registrars to process the forms. and we accept, in general, the issue of a receipt by the club as proof of membership in those few weeks. (One exception, as an example, is entry to an International competition for which you require a sporting licence.) This means that it is of no benefit to you to delay paying your annual fee until February or March; insurance cover is not back-dated. If you have not paid your fee, do not fly unless, of course, you are so rich that you can afford to pay any award made against you if you injure someone or cause property damage. My club has already (early May) billed its members for the 1990-91, and several have already paid. Again, I advise you to check the membership status of anyone flying at your field, especially during the first few weeks of the new membership year. It is your pocket that you are protecting. Concessional membership is granted to new members and to previous members whose membership has lapsed for at least five years who join in the period 1st April and 30th June. They are given membership until 30th June of the following year on payment of the fee for the coming membership year. Pensioners holding a medical entitlement card need pay only the junior fee.

Insurance 1.

Notice was given in the past few weeks of two incidents giving rise to possible claims. In one a model landed on the roof of a nearby factory after radio failure, denting a roofing panel. In the second a model hit a parked car, again after radio failure, causing about $600.00 worth of damage.

Insurance 2.

An importer of radio equipment has reported that RC equipment operating on 72 MHz is being brought into the country and attempts are being made to convert it to 36 MHz, allegedly without much success. Some owners have apparently returned their sets to Japan for repair and have been advised to buy new modules and receivers. Such equipment cannot possibly carry the compliance plate which the Department of Transport and Communication requires RC equipment intended for licence-free operation to have. Their use is therefore illegal and carries the risk of heavy fines and confiscaion of the equipment as well as possibly invalidating any insurance cover. You should be aware that the MAAA frequency and bandwidth separation stickers are not compliance plates.

A Possible Problem Radio

I have also been told, but have no proof, that one brand of RC equipment has a tendency to 'drop' a channel; that is, for example, the rudder may stop moving but the throttle works instead. The throttle control will then work one of the auxiliary functions, perhaps undercarriage retraction. In the early 1970s the then available Space Commander was heat sensitive. As the daytime temperature increased, elevator control and then aileron control were lost. The problem now reported sounds different. If you have experienced such a problem, would you please supply me with details, including brand and model of the radio, battery condition and a general description of what other model flying was going on, with the relative location and frequencies of other transmitters operating simultaneously. It's a lot to ask, but without facts nothing can be done.

Safety 1.

David Axon, our MAAA President, was seen recently with an injured finger. Ha, I said, another prominent victim of a rotating propeller. Not so, he told me, but of a wood router while renovating his house. Obviously wood routers and house renovating are dangerous, and care must be exercised. Will this report cause wood routers, houses or house renovations to be banned? My report of Ivor F's adventures at the WA Natiuonals has been believed by some to be prejudicial to the interests of our sport.

Safety 2

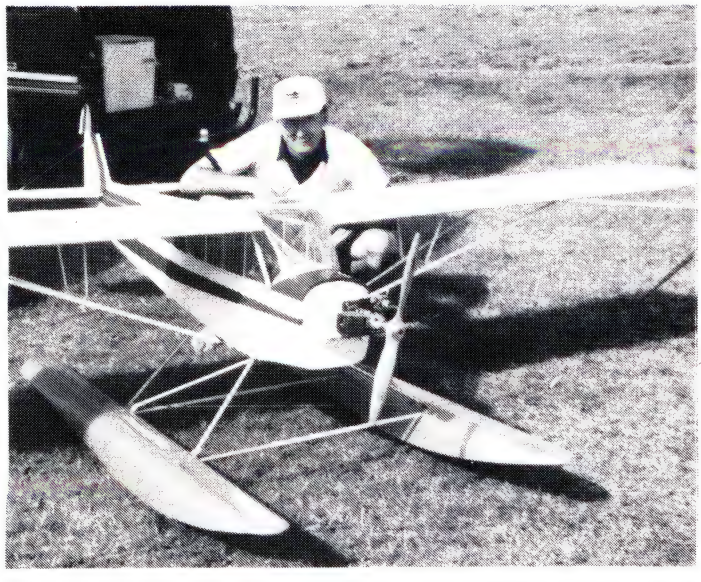
I mentioned in the last issue that the safety column in the AMA magazine, Model Aviation, had come under criticism, similar to that levelled at this column, for its inclusion of comments on safety related items. The AMA columnist, in a recent issue, reported on statistics derived from emergency treatment rooms at hospitals in the USA. From those statistics, the most dangerous sport (in the USA) is golf. Admittedly, probably more peoply actually play golf than any other sport, but even with that proviso, golf is dangerous. Injuries resulting from the operation of model aircraft were too few to be identified in the statistics.

Pen Friends

At the present time there is no affiliated club in Derby, WA, although one may be formed soon. In the meantime, Wayne Campbell, of Box 712, Derby, WA, 6728, would like to correspond with clubs in other states. Any volunteers?

CIAM

As is usual, I attended the recent Plenery meeting of the International Aeromodelling

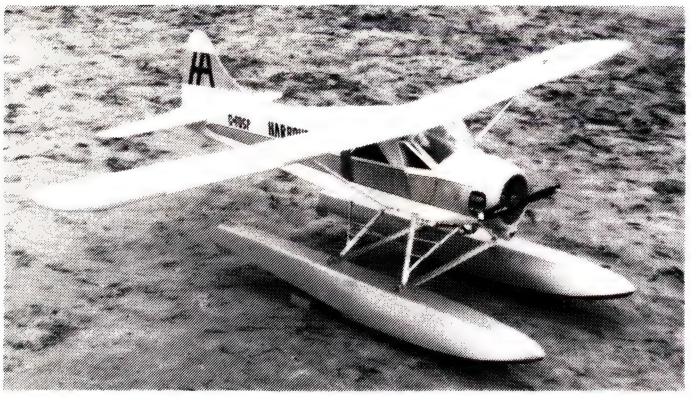




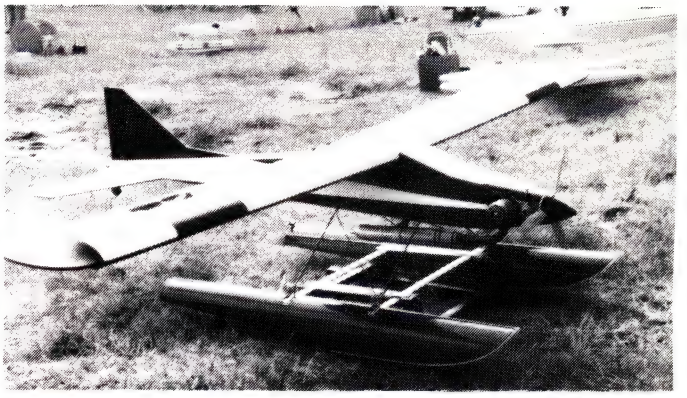
This mean-looking beastie is a Little Special from an RCM&E plan, and very nicely put together by Terry Ray. The OS FP ABC .32 was enough power to turn the model into an attack plane as it took a nasty mid-air bite out of Allan Trinder's Easy 100 late on the Sunday at the Sydney Float Fly. Photo by Brian Winch

A Tim Nolan monster with 12 foot wingspan. Construction of the fuselage comprises 36 metres of 6 mm diameter stainless steel tubing with a ½ mm wall thickness. Joints by T.I.G. welding. The wing ribs are 6 mm balsa, and you can just sneak three per 1200 mm sheet. Model is scaled version of Phil Dalhuntey's VH DUL Super Cub. Power is modified Tartan Twin. Winch photo at Sydney Float Fly.

Protect your privilege to fly model aircraft; Join the MAAA; Join an MAAA affiliated club.



This delightful Beaver was built by Andrew Wallace from a Midwest kit. Wingspan is 8 foot, and power is an OS 120 four-storke. Much photographed throughout the day at Sydney Float Fly. BW took this pic.



Allan and (son) Scott Trinder developed this crowd pleaser from an Easy 100 design. Floats are foam and glass with Simone board under front section. Power is by OS .61 FSR. At Sydney Float Fly. Photo: Winch.

Commission. It was held in Paris on April 5th & 6th. I left Melbourne on April 1st and arrived back just before midnight on the 9th. There was a slight delay at one stop; an oil seal on the generator on the No. 4 engine had to be replaced. Otherwise there were no problems.

The meeting was held at the Railway Union Building, three stops on the metro from the previous venue at the French Aero Club. It is a modern building sharing a block with the Australian Embassy. My room in the Hotel Suffren, next to the meeting venue, overlooked the Embassy, which is an impressive structure. Many years ago an important Friday afternoon affair in embassies in two countries I visited was a prayer meeting. By the number of people entering the building at about 5.30 pm, I guess prayers are still held.

The meeting was attended by 106 officers, delegates and observers from 33 countries. The USA had 15 attendees, France 11, the UK and Holland 10 each. Ten countries had two representatives and eleven, including Australia, one. A full report has been sent to all members of the MAAA sub-committees and to the State and Territory Associatiions. Most of the changes agreed to will not come into effect until 1993, but a few are effective immediately, and I will note these. Noise was a topic also worthy of mention.

The pull test for CL Speed has been reduced to 50G because the 60G load approved last year approached the yield strength of the wire. The CIAM President was very critial of proposals being put forward without adequate testing, which obviiously the 1989 proposal had not had.

Also effective immediately is a requirement for requests for approval of World Cup Open International events to be submitted by November 15th of the previious year. Actually, this rule was put into effect last year, even before it was listed on the agenda. (The rules permitted requests for sanction of Open Internationals to be made up to three months before the event. Last year, late in November, I submitted the request for the AFFS Championships at Easter to be an Open International. The event was excluded from the Free Flight World Cup list. I have apologised to the AFFS for my tardiness, but am of the opinion that the Plenary meeting rubber-stamped a decision already taken and put into action. *And which pre-empted Chris' action.*

With effect next year, two events per year in any one country may be selected to be World Cup events, although competitors may count the results of only one contest held in each European country. As I read it, this will give the New Zealanders and Australians a better chance than they have at present, because they will need to travel only to Australia and New Zealand, and not to Europe or the USA as well, which is necessary under current rules. Things are also simplified for USA and Canadian flyers. Perhaps my comment of 1986, that the World Cup would be a European benefit, has been seen to have some basis, although in every year since then a US flyer has been a winner. Of course, there could be top point-scorers in the three blocs: Australia-NZ, the Americas and Europe, under the new rules in each class. That will probably require another rule change.

Effective immediately, the use of automatic timing to change the pitch of the propeller in RC aerobatics (class F3A) is not permitted. As an aside, the flying of RC helicopters would be a lot harder if a similar rule applied to them. The modern transmitters permit automatic mixing of rotor blade pitch with engine speed.

Also effective immediately, the 150 metre line along which RC aerobatic manoeuvres should be performed, is measured from the pilot position and not from that of the judges.

For RC gliders (class F3B), from January 1991 the under side of the model may have no protruberance except the towhook and surface control linkage. From 1993, the size of the towhook will be limited. For safety reasons, effective immediately, the flying of a model in class F3B at a height of less than three metres over designated safety areas, or landing in those areas, will incur a penalty.

In scale, the bonus points for monoplanes with undercambered wings was corrected to read 5% instead of 10%, effective immediately.

As I mentioned earlier, noise was an important topic. The free flight subcommittee put a case for imposing no limit on noise from F1C (power) models, recommending that the models be flown far from population centres and pointing out that the duration of the noise was brief. It also proposed that those flying the models wear hearing protection. The plenary meeting agreed with a new paragraph in the Organisers' Guide requiring that flying sites be remote from dwellings, but not with the requirement for hearing protection. It required a definite proposal on noise reduction for free flight power models to be put to the Bureau meeting in December.

The pylon sub-committee was given the same instructions.

The CL technical meeting put forward proposals for Class F2A, F2B, F2C and F2D (speed, aerobatics, team-racing and combat), to become effective by 1993. These proposals, which are to be tested before they are implemented, are:

F2A - a muffler is compulsory. Minimum internal volume is 50 cc. Maximum tail pipe internal diameter 6 mm. An effective engine shut-off is compulsory so that the time duration at high noise level can be limited to 20 to 30 seconds per flight.

F2B - A muffler must be used except on 4-stroke engines. In either case the noise limit will be no higher than 96 dB as is current practice.

F2C - The maximum cylinder liner exhaust projected area to be 60 sq mm. The piston face at the exhaust outlet shall not be visible from the exterior of the model when side or front exhaust engines are used.

F2D - Glow engines shall use a simple chamber muffler of minimum internal length 40 mm, internal diameter 20 mm and maximum tail pipe internal diameter 8 mm. Any other shape of the same volume - 4 x cc is acceptable. Compression ignition engines may remain unsilenced

With effect 1992, RC aerobatics noise limit will be reduced from the current 98/96 dBA to 96/94 dBA. However, in 1993 the requirement to fit a muffler will be deleted as being no longer necessary.

The RC helicopter technical meeting proposed limits of 98 dBA over a hard surface or 96 dBA over grass with the helicopter hovering at eye level and the microphone at the same level, three metres away. A complete proposal will be put to the Bureau in December.

In 1992, scale models will have to meet 96 dBA at three metres, with ducted fans permitted 100 dBA until 1993 when the 96 dBA limit must be met.

The failure of free flight and RC pylon to propose limits put those classes, according to the CIAM President, at risk of having to meet the 96 dBA limit. The USA warned that the meeting was treading a narrow line and risked killing a class to achieve its aim of reducing noise. Earlier the President had said that the Bureau was not creating problems but had a duty to safeguard the sport.

The USA comment about killing a class, presumably pylon, is interesting in the light of a comment by a US columnist, who is closely related to a prominent F3D flyer, in a UK magazine published before the Plenary meeting was held, that there may not be another RC Pylon World Championships because of the lack of foresight and brilliance in CIAM. But for the patience of the President and the anxiety of all CIAM members to foster all classes, the column-

ist would have been right. The unpleasant fact is that, in Europe, noise from any source is not being tolerated. Authorities there are making allowances if an obvious effort is being made to decrease the nuisance; otherwise unrealistic limits are being imposed. Werner Groth, the delegate from West Germany, who was recently my house guest, told me of the constraints the West German flyers suffer. Noise is also becoming more of a problem in the USA; the CIAM subcommittee chairman admits to having to drive 100 miles to practise. In Australia, in most areas, the F3D flyers can still find a field that is reasonably close; perhaps only fifty kilometres away, but the situation will change. Without a noise limit, it is likely that a World Championships would be flown only between Australia and the USA, and would probably not have FAI sanction. At times F3D has been likened to motor racing Formula One because noise is part of racing. However, until F3D attracts the same size crowd as does Formula One, the nuisance it causes will not be accepted.

The 1990 Asian Pacific & Kraft Masters RC Aerobatics

As well as attending the CIAM meeting in April, I also attended, as a jury member, the 1990 Asian Pacific RC Aerobatics Championships which were held at Drage Air World, Wangaratta, in conjunction with the 1990 Kraft Masters. As usual the events were sponsored by Eddy Lo, an importer of, among other things, model aircraft supplies. He has supported the Australian Pattern Association for many years in its efforts to improve the standard of RC aerobatic flying in Australia. The full extent of his involvement may never be truly identified because of his reticence. Suffice it to write that it is because of his committment that several world class flyers and judges have been at the Kraft Masters in recent years.

The Kraft Masters was a cliff-hanger. Quique Somenzini from Argentina had been second to Chip Hyde after the four qualifying rounds, gaining only one 1000 point score to the three that Chip earned. He had also placed behind him at the 1989 World Championships. Quique top scored in all three final rounds to win the Kraft Masters for the second time with 1000 points to Chip's 991.79. Quique immediately went off to telephone his father with the news, even though the local time in Argentina was 4 am.

One of the judges on each flight line was a European, Werner Groth from West Germany and Alex Goossens from Belgium. Both are accredited judges to CIAM, and both have judged at World and Continental Championships. Another judge on each line, Brian Williamson and Ford Lloyd, had attended the judging school recently conducted in Australia by Ron Chidgey, and both are also accredited judges to CIAM. Ford is also a member of the US Scale and Pattern Judges Association and has judged at several of the recent US Nationals. There can be no complaint about the standard of judging.

The contest director was Henry Hutchinson, with Mark Schirmer and Alan Turton (both ex-RAAF, incidentally) as line directors. Brian Green and Bev Hutchinson operated the computers, while Chas Banhelyi, the co-ordinator for the event with the Wangaratta Council, operated the radio 'Wangaratta Advisory' to communicate with aircraft wanting to use the airfield.

The whole affair served to demonstrate, to the Europeans in particular, that the expertise and facilities are available to run a major F3A competition here, and that Australia's bid too host a triple World Championship at Wangaratta in 1993 is soundly based. What is now needed is support, primarily financial. It is unrealistic to expect that support from the model aircraft business in Australia. If you believe that your firm can derive some benefit from sponsoring some part of the 1993 RC Aerobatic, Helicopter and Pylon World Championships at Wangaratta, I will be only too happy to put you in contact with the organisers. Hosting the events is very expensive and requires careful budgetting. For reasons as yet unknown (to me), the AMA incurred a loss of $30,000 in hosting the 1989 triple World Champs.

Unknown to most of those present at the Kraft Masters, the quick actions of MAAA members saved the life of an elderly bus passenger on the Sunday. (Drage is also a rest stop for inter-state coaches.) Cheri Battersby, the wife of the VMAA secretary, noticed a woman having a severe asthma attack. She called Toni Jamieson, MAAQ CL administrator, who has experience with asthma sufferers, for assistance. Max Bowater, AWA President and pattern flyer, as well as a doctor, accompanied them. The woman's heart stopped shortly after they reached her. Max and Toni worked as a team to revive her. Having witnessed this miracle, I urge you to become proficient in external cardiac massage and expired air resuscitation; you never know when your help might be needed. My club had a demonstration, but not practice, some time ago. Unfortunately, there are little things you do not pick up in the demonstration. For example, Max commented that he had to blow hard because the breathing passages were blocked. *Cheri, Toni, Max: thank you! We are proud of you!*

A New RCAS[NSW] Secretary

After just on ten years, Ian Avery has stood down as Secretary and Newsletter Editor for RCAS[NSW]. The job of Secretary to an organisation of 2000 members is challenging enough. To prepare and publish, in addition, a newsletter of the quality achieved in the RCAS newsletter makes the effort superhuman, especially when continued over so many years. Ian's principal model interests have been Old Timer, glider and RC electric. He was team manager for the RC glider team that competed at the World Champs in Germany in 1987. At some time, and it may continue, he had an interest in amateur radio, and this enabled him to make valuable comment of RC frequency matters. Ian has earned our gratitude for a job superbly done without thought of benefit to himself. His place as Secretary has been taken by Bob Carpenter, who was President of RCAS[NSW] for several of the years that Ian was Secretary. Bob's address is 228 MacQuarie Street, Windsor, NSW, 2756. *Well done Ian!*

RCAS[NSW] Hot Line

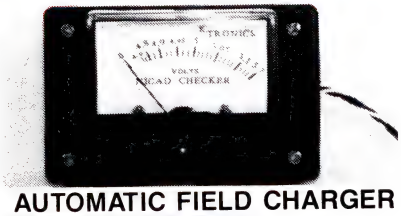
A recent RCAS innovation is a hot line. Anyone in NSW (or Australia) can ring (02) 821 1924 and hear a recorded message about RC flying and RCAS[NSW]. There is a facility to leave a name and address for the despatch of information about local (NSW) clubs. The line is not intended for complaints but for genuine enquiries about how to get started in model aviation. It is an idea worth copying.

Logo Design Competition - Win $500 Cash!

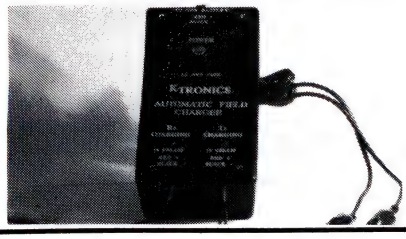
The Australian Sport Aviation Confederation (ASAC) was formed in late 1989 as the national confederation of sport and recreational aviation organisations. On 1 January 1990 it became the Australian representative of the Federation Aeronautique Internationale (FAI), the world governing body for aeronautical and astronomical records and the aviation sports. ASAC requires a logo, and is offering a prize of $500 cash for the winning entry in this logo design competition. Details of the competition can be obtained by contacting Harvey R. Ritchie, ASAC Executive Director, on (06) 281 6830 or (06) 281 5358;

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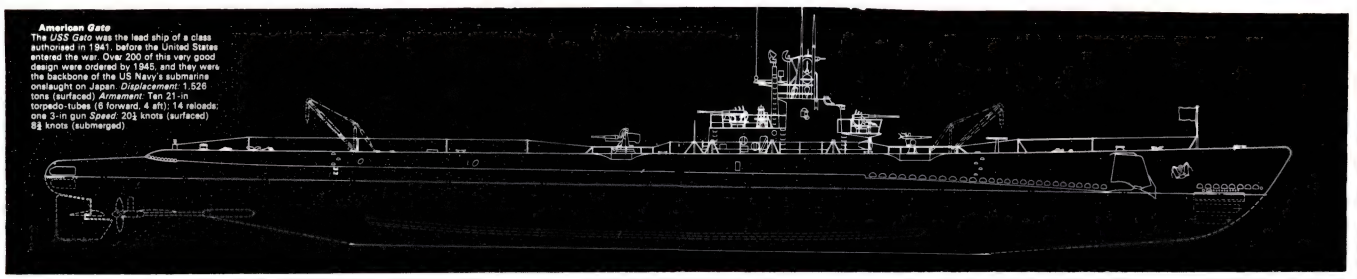
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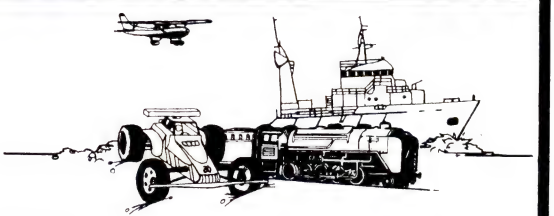
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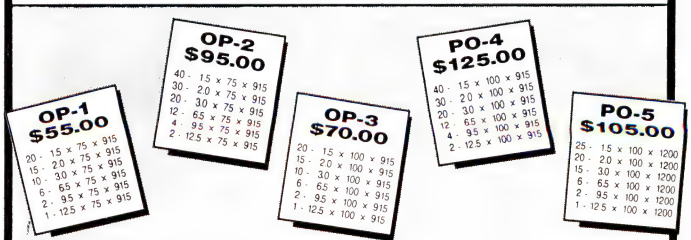
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Torque	2.1kg-cm
Current:	
Idle	8mA
Running	150mA
Max	550mA
Dimensions	18.5x38x39
Weight	45gm

SO-310 SPECIFICATION

Supply Voltage	DC-5v
Speed	0.21sec/60°
Torque	3.1kg-cm
Current:	
Idle	8mA
Running	170mA
Max	800mA
Dimensions	18.5x38x39
Weight	46gm

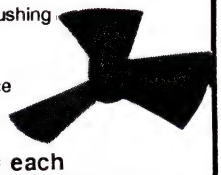
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Tip Pitch Angle	16.5°
Outside Diameter	102
Total Height	28

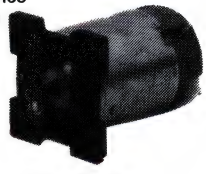
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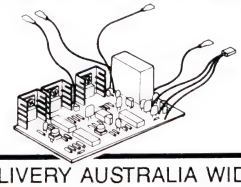
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SPECIFICATION

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Dimensions	90x55
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Operating Range	6-16v
Nominal	12v
No Load:	
Revs	3600rpm
Current	0.6 Amp
At Max Eff:	
Revs	3053rpm
Current	3.34 Amp
Torque	700gr.cm
Output	21.93 W
Eff	54.7%

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- Full Speed Forward and Reverse
- High Efficiency Power Conversion



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Input Signal:	
Standard	PWM
Full Forward	2.0MS
Centre Off	1.5MS
Full Reverse	1.0MS
Output	0.12VDG 5 Amp (10 Amp Peak)
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Weight	130gm

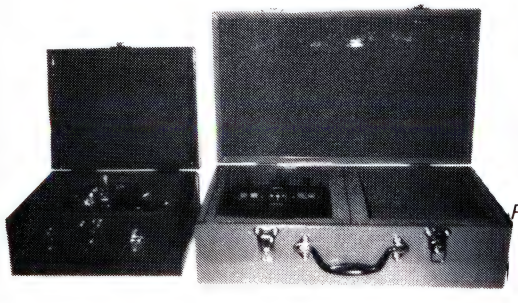
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FREE FLIGHT TOPICS

by Merv Buckmaster

3RD PACIFIC FREE FLIGHT CHAMPIONSHIPS
Carterton, New Zealand, 1990

F1A - 4th February 1990; 25 flyers

Weather

Cloudy in round 1, with light winds. Venue shifted to a different farm at the end of round 1. Cloud burnt off by end of round 3 leaving a cloudless sky with very light winds. Very strong thermal activity, but tricky to pick sometimes, with some huge holes, especially in the last round.

F1A (25 flyers)	Team	Total
1. M. Sexton	RG89	1260
2. G. Higgins		1243
3. P. Crump	SS	1222
4. G. Curtis	NZ	1212
5. M. Gregorie	EI	1209
6. R. Wallace		1175
7. A. Edwards	AUS	1174
8. M. Le Docq	EI	1158
9. I. Weston	RG89	1151
10. R. Anderson		1138
11. P. Lagan	NZ	1135
12. W. McGarvey	RG89	1126

TEAMS

RG89	Argies 1989	3537
EI	Equipe Internationale	3487
NZ	New Zealand	3407
AUS	Australia	3289
SS	Southern Slashers	2217
AKC	Auckland Colts	2090

F1B - 3rd February 1990; 19 flyers

Weather

Flat calm for rounds 1 and 2. Windy (up to 7 metres per second) during rounds 3 and 4. Moderate winds during rounds 5, 6 and 7. Cloudless skies all day; very hot.

	Team	Total
1. R. Blackam	AUS	1258
2. D. Ackery	NZ	1210
3. C. Collyer		1203
4. B. Chinchella	AGO	1181
5. P. Lagan	NZ	1024
6. A. Bryant	AUS	989
7. J. Coombs	AUS	987
8. W. McGarvey		959
9. J. Malkin	NZ	868

TEAMS

AUS	Australia	3234
NZ	New Zealand	3102
AGO	Aussie Golden Oldies	2242
WHA	Whakatane	1360
AKC	Auckland Colts	1198

F1C - 6 flyers

1. P. Nash	AUS	1560
2. J. Fletcher	AUS	1545
3. D. Thomas	AUS	1225
4. P. Smith	NZ	1131
5. I. Weston	NZ	767
6. D. Tristram	NZ	537

TEAMS

Australia	3865
New Zealand	2435

A1 - 8 flyers

1. C. Murphy	457
2. N. McDougal	402
3. R. Anderson	379

P30 - 4 flyers

1. G. Baynes	283
2. A. Thomas	277
3. C. Murphy	156

TRANS TASMAN CHALLENGE

By virtue of the fact that the Australian team won F1B and F1C, they took out the Trans Tasman Trophy.

A.F.F.S. FREE FLIGHT CHAMPIONSHIPS; at Canowindra, Easter 1990

RESULTS

Friday 13th April

COMBINED % OPEN (22) *Scores in Percentage*

1. B. Taylor	P30	300 + 178
2. R. Blackam	A2	300 + 172
3. B. McGarvey	A2	300 + 91
4. R. Summersby	OP	300 + 90

Saturday 14th April

OPEN POWER (8)

1. S. Hinds	540	+ 267
2. J. Fletcher	540	+ 186
3. J. Pennells	527	

P30 (13)

1. B. Taylor	417
2. P. de Visser	360
3. T. Isted	331

SCRAMBLE (12)

1. T. Stowe	1353
2. P. Scott	1253
3. J. Snaith	1205

Sunday 15th April

F1A (18)

1. P. de Visser	1260
2. V. Morgan	1234
3. P. Lloyd	1172
4. B. McGarvey (NZ)	1140

F1B (11)

1. R. Blackam	1290
2. D. Ackery (NZ)	1268
3. J. Malkin (NZ)	1264

F1C (7)

1. J. Fletcher	1309
2. S. Sherlock	1206
3. S. Hinds	1201

OPEN RUBBER (10)

1. G. Odgers	540
2. P. de Visser	533
3. C. Collyer	515

Monday 16th April

SCALE

1. G. Odgers	Gloucestershire Gannet
2. S. Hinds	Auster Air Ambulance
3. R. Craine	D.H. Tiger Moth

F1G (9)

1. R. Samuel (J)	511	+ 170
2. R. Blackam	511	+ 130
3. S. O'Connor	478	

F1H (12)

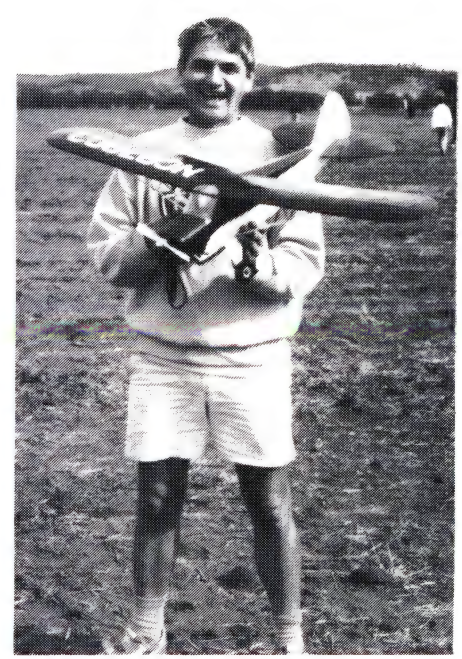
1. J. Snaith	590
2. B. Taylor	577
3. D. Ackery (NZ)	555

F1J (10)

1. B. Taylor	577
2. A. Coppock	517
3. S. Hinds	515
J. Fletcher	515

HLG (17)

1. P. de Visser	180 +	60
2. S. Pennells (J)	180 +	59
3. R. Samuel (J)	180 +	38



Reg Towell enjoys flying Free Flight Scale, especially on a calm day, with his nice Piper Super Cruiser. The event at Canowindra was enjoyed by flyers and spectators, and by cameraman John French.



The prize winners of F1B Wakefield at the Pacific Champs prize giving. Right to left: Dave Ackery, NZ (2nd), Richard Blackam, Aust (1st) and Col Collyer, Aust (3rd). Bill McGarvey places the koala on Col's shoulder. Andrew Robinson caught the fun of the occasion.



At the Pacific Champs prize giving, the top three placegetters in F1C Power, right to left: Dave Thomas (3rd), Peter Nash (1st) and Jon Fletcher (2nd), all Australians. Rod Lewis looks on. Andrew Robinson with camera.

SAFER STORAGE FOR RUBBER

from Boyd Felstead

Boyd credits the following idea to Bernard Smith of Corryong. Much attention has been given to the preparation and use of rubber motors. By comparison, storage of them has been neglected. The only point established is to store them in a cool, dark place. Bernard has recently discovered that polythene plastic bags, of the usual sort, of dense, flexible plastic, give off vinyl chloride, which is a very reactive chemical which harms the rubber, probably by slowly polymerising and/or terminating the long rubber molecules.

The rubber should be stored in polyester bags, such as Oven Bags, because they are chemically inert. They are transparent, and have a crunchy texture, making them fragile compared with polythene bags. The vinyl chloride cannot be washed out of the polytherne bags, and it also penetrates the polyester if an oven bag is placed inside a polythene bag.

Bernard also noted that the translucent paper envelopes used to contain stamps sold in dealer shops are chemically inert, and could be used to store made-up indoor rubber motors.

Thanks Bernard and Boyd for this advice.

One final caution: don't use an oven bag to cook a roast after it has been used to store some rubber!

RICHMOND WINS!

At the recent Indoor World Championships, reigning Champ, Jim Richmond, defended his title successfully, and the three USA team members followed to make a clean sweep of the results. The following scores came from Tennessee via Boyd Felstead:

1. Richmond	87:36
2. Banks	83.47
3. Randolph	83:27
4. Cailliau	78:42
5. Nori (Finland)	78.18
6. Butty (Switz)	77:51

PROPELLER DEVELOPMENT

A promising idea for propellers for rubber models from Bob Hatschek, as reported in FFn, June 1990, is to increase the diameter and reduce the blade width. Bob has tried it with a Coupe-size model, although using a motor of 12 strands of 1/8 rubber, and had good results. The larger prop absorbs the torque of the motor more efficiently, running at lower rpm for much longer, and apparently providing enough thrust to keep the model climbing, albeit slowly. This is most advantageous in rising air. A pattern is given for the C d'H prop, and other features are described. FFn provides the latest ideas in FF, mostly from Europe, and is available from: Ian Kaynes, 7 Ashley Road, Farnborough, Hants, GU14 7EZ England.



Monty Craine ran for his Dad, Bob, in the Scramble at Bunbury, retrieving this Ron Warring designed Titch from 1952. Placed second in night scramble. Looks like a DC Dart there!



Phil Stevenson and Ben Carter concentrate on Phil's Ol' Tiger peanut at the Macquarie Model Soaring Club rubber day. Paul Shallow photo.



Alan and Craig Pearson with another little beauty at Macquarie Uni. Pic by Paul Shallow.



GUMNUTS

FUN FLYING WITH SMALL MODELS

PIPIT

The simple ROG has survived the evolution of aeromodelling. As RTFs and kits they are still great sellers, and pennywise, no other form of flying yields the fun that an ROG does (especially so if a touch of care and sophistication goes into it). The inherent weakness of the ROG is the stick fuselage which tends to bow and twist when the motor is fully wound. With this in mind, the Pipit was designed around a light, strong, tissue-covered fin-fuselage unit to overcome that problem.

Although most Pipits will be flown outdoors, the nose was kept short to give good turning characteristics sought by indoor adherents. Choice of propeller greatly influences nose weight. A Japanese 4¾ inch diamater prop placed the balance point exactly where required, and the prototype flew without any trimming whatever.

For the outlay of two hours and some balsa scraps, this model will, if you stick to the cardinal rules "KEEP IT LIGHT" and "KEEP THE TAIL LIGHT", prove to be the best of the genre. Select firm, light stock (strip it if required) and get started!

The Fuselage. Prick out the corners of the nose-wing carrier onto the sheet balsa and cut out with a sharp bladed knife and steel rule, Check for accuracy by placing on plan. If satisfied, pin this down, add the strip members and nose hanger, and glue up the structure. When dry, turn the fuselage over and glue the plan side just in case the cyano did not reach.

The Wing. This is best built in one piece. Pin down the left panel with enough leading edge protruding to accommodate the right wing. When built, simply shift the completed panel left, and add the right one. Remember the wash-out!

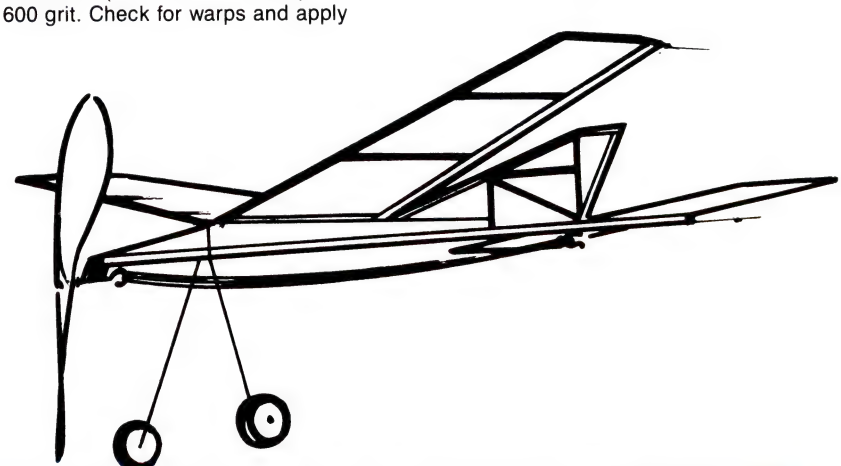
The Stabiliser. This is sanded-doped light 0.8 mm (1/32 inch) sheet. First sand down the sheet using 400 grit until translucent when held to the light. Next brush on two coats of very runny clear dope with plasticiser and allow to dry. Lightly sand using 600 grit, and cut out the stab. With the 600 grit, smooth the corners and edges.

The heart and soul of modelling is SANDING, so give it your all. For lightness, using a sanding block, taper the fin away from the motor stick as shown on the plan (this is vital to shave off rear end weight), and radius the edges. Next the wing, still in one piece, is sanded, using the block. Small models like sharp leading edges, so spend time and BE CAREFUL, as uncovered structures are fragile. Similarly, taper the trailing edge and rear end of ribs. Wing section is not critical, but aim for something like that on the plan, and make sure that both panels are the same.

Covering. Select the lightest, crispest tissue you can find, and apply it to the framework with water-thinned PVA glue. Cover the wing (still in one piece), both top and bottom (unusual for an ROG, huh!). The fuselage is similarly covered, sheet 'n' all. The tissue is water shrunk to tighten it. The method I use on small models is a tooth-brush dipped in water, flicked once, then held 6 inches from the tissue. With the thumb I stroke the bristles backwards. This delivers a delightful mist onto the tissue. When dry, with a blade, trim off excess tissue (don't nick the wood!) and sand with 600 grit. Check for warps and apply two very thin coats of clear dope, sparingly. Touch up the edges with 600 grit.

Finishing. Part the wings with a stiff blade, bevel the root ribs, and glue to the correct dihedral angle. The easiest wing ever! Glue the rear hook, undercarriage and thread-bound thrust bush to the fuselage, and install the propeller. Glue the stab and wing onto the fuselage, sighting gun-barrel fashion for symmetry. Attach the shampoo-lubricated rubber, and head for the oval.

Flying. A test glide will indicate minor corrections needed (usually a touch of clay or removal of a warp). Try some hand winds (50 to 75) and let 'er go. Add turns gradually until the trim takes all you can give. You will be amazed at the Pipit's peformance. It is a picture in flight.

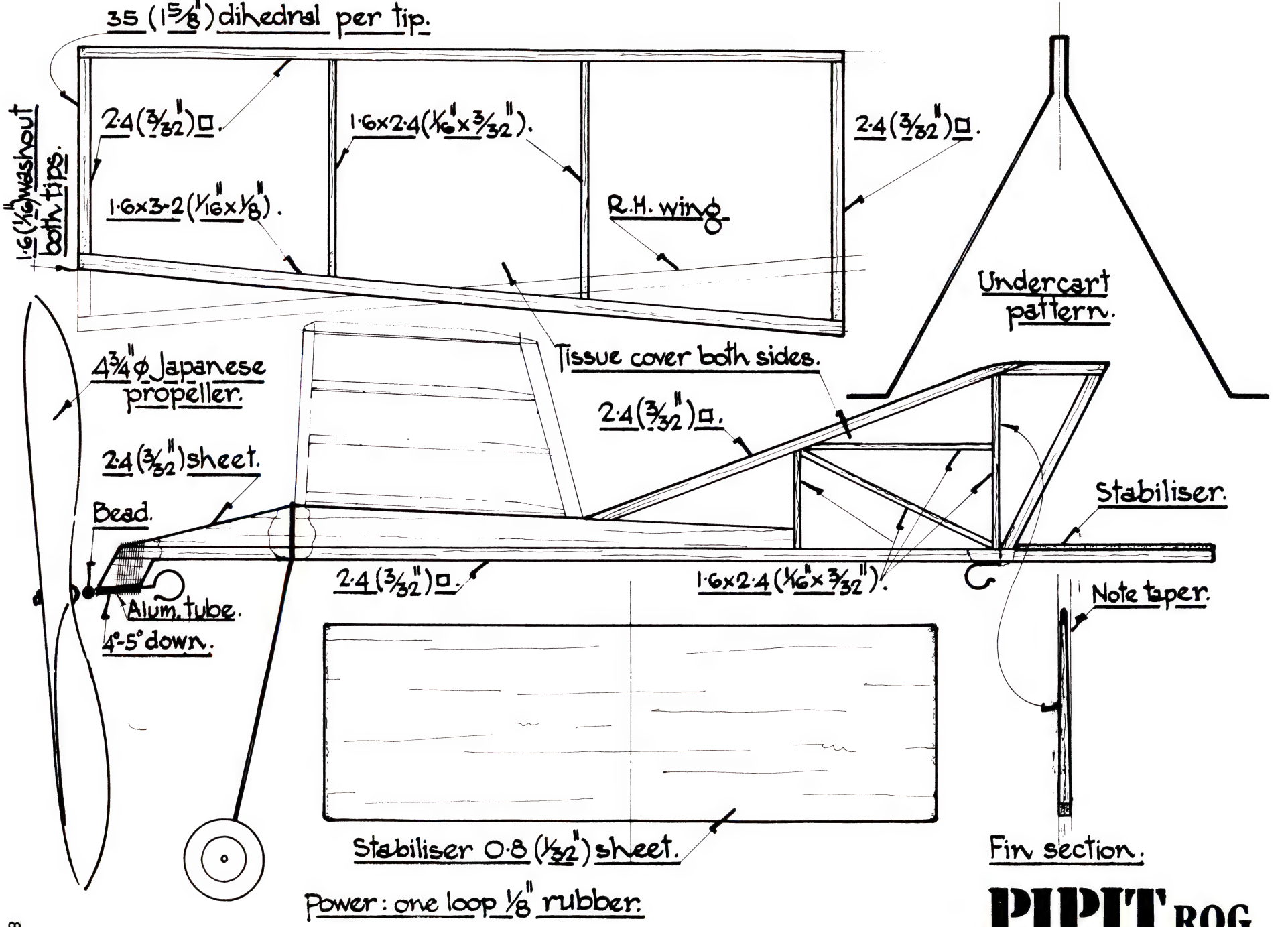


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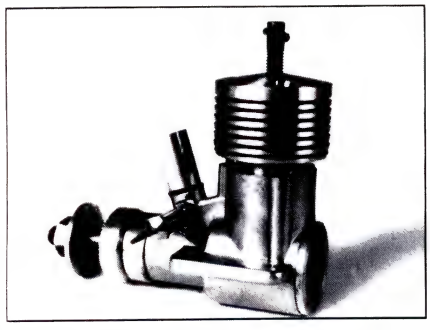

35 (1 5/8") dihedral per tip.
1·6 (1/16") washout both tips.
2·4 (3/32") □.
1·6×2·4 (1/16"×3/32").
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R.H. wing.
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2·4 (3/32") □.
2·4 (3/32") sheet.
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Stabiliser.
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side mounting onto the profile model for Goodyear CL racing events. More importantly, the PAW 249 TBR-GT is a really potent performer, generating .5 BHP at 21,000 rpm, with the excellent fuel economy required for this type of racing. The "proof of the pudding is in the eating", especially since the PAW 249 TBR-GT has cleaned up the Goodyear events in the British Nationals.

The popular PAW 149 engine is also now available in single ball race PAW 149 BR and twin ball race PAW 149 TBR. Both CL and RC ball race versions are currently available from our stock. The potent PAW 149 TBR-GT version for British ½A Goodyear racing is also available. We beleive that some of you chaps out there are having good success with the PAW 149 TBR-GT version in the Old Timer 2 cc events. At present we are out of stock of the PAW 149 TBR-GT, but more will be in stock soon.

STOP PRESS — IRVINE AE020 .2 cc DIESEL
We have a batch of very diminutive diesel engines of .2 cc capacity; yes, only point two of a cubic centimetre, on the way to our store. They will be here by the time you read this news. This is the Irvine AE020 diesel engine, complete with integral fuel tank and spring starter. Mark Wood of Irvine Engines advised that the AE020 is very well made, will start easily and is selling like "hot cakes" in England. We spoke to Mark on the phone and pointed out very emphatically that the AE020 must be easy to start otherwise we are not interested. We can't wait to test out this little gem. Cost of the AE020 is $156.35.

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PAW 35 DS w/muffler	5.75cc
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PAW 249 Contest-4	2.49 cc
RC THROTTLE EQUIPPED ENGINES	
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PAW 149 RC	1.49 cc
PAW 249 RC	2.49 cc
PAW 19 RC	3.25 cc
PAW 29 RC	4.75 cc
PAW 35 RC	5.75 cc
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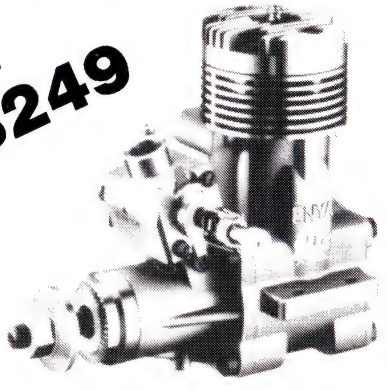
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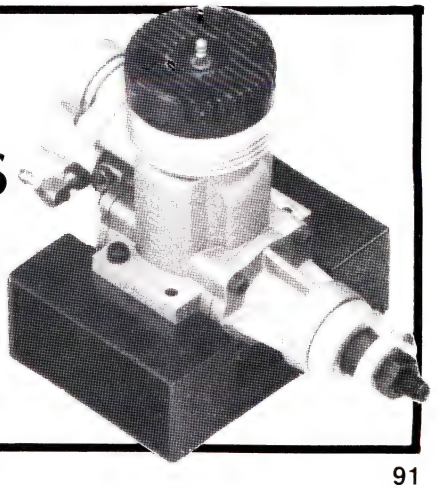
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CONTROL LINES

by Ivars Dislers

I would like to thank regular contributors from New Zealand, Andrew Robinson, John Ryan and Alan Lawrence, for the latest NZ news and photos. The Pacific Control Line Champs material has been held over for the next issue. Those at that event were privileged to see the current USA number one FAI Speed flyer, Carl Dodge, win FAI Speed with a world class 289 kph flight. His participation was most welcome, as Carl is a fine sportsman and ambassador for US control line flying.

REVOLUTIONARY TORQUE

The New Zealand CL Technical Committee publishes a first rate control line newsletter called Revolutionary Torque. Contents have a competition orientated, technical flavour and extensive cover of NZ competitions. There are 6 issues per year @ NZ$20.00. Thoroughly recommended reading. Available from: David Sanderson, 16 Roto Street, Te Kauwhata, New Zealand. Control line is alive and well in New Zealand.

NEW CONTROL LINE RECORDS

Alan Barnes has broken his own New Zealand FAI Speed record on 2 occasions. First set at the 1989-90 NZ Nats with 263.35 kph, then 263.54 at the Pacific CL Champs and most recently 265.87 kph at the Taranaki Champs. Alan also set a new NZ 3.5 cc record, doing 258.99 kph at the NZ Nats. Another NZ record tumbled at the Taranaki Champs when A. Boys & R. Bolton recorded a 3 minute 47.3 second NZ Goodyear heat time using an OS 21 and pipe to power their Mr. D model. (Note: NZ rules allow .21 engines and use of tuned pipes.) R. and T. Fitzgerald recorded a 3 min 41.41 sec heat and a 7 min 42.18 sec final at the 1990 Vic State Champs to provisionally smash the Australian Goodyear record. They used a crankcase pressure fed Nelson 15 FI diesel and a Mr D. Congratulations to the modellerws involved. The quest for excellence has its rewards.



Alan Barnes and his record-setting F2A machine. He designed and made the engine as well as the model. The best engineering in the world. Robinson photo.

See the new book, Aeromodelling Digest 1990 (advertisement this issue), for some of the details about Ivars' own record-setting speed models, Bunyip and Mongoose.

A NEW C.L. CLUB IN W.A.

Modellers looking for a CL club to join north of Perth or near the suburb of Kingsley, may like to try: M.A.C.K. Contact person is Phil Colback, (09) 401 0457.

T.S.T. KITS NOW AVAILABLE

The Thornlie & Districts Stunt Trainer is a profile fuselage model with foam core wings, for 2.5 cc engines. My WA correspondent, Charlie Stone, has advised me that, in response to enquiries, the club will make the club kit available to individuals and clubs outside WA. The Jim Stivey design is also intended for Slow Combat, and is often used for this purpose in WA. Charlie writes "Make out cheques to T.A.R.M.A.C., and send to Phil Garstone, 32 Greenway Ave., Thornlie, WA 6100. Allow about a week after receipt of the letter to get it packed up and sent, plus the usual Australia Post delivery time as well. Cost is $30, plus $5 postage.

Finally, I welcome your letters, suggestions and contributions. A stamped, self-addressed envelope is required if you need a reply. I try to use as much material sent in as I can, but I hope that contributors will appreciate that I can use only a sample of the photos sent in, and allow that some editing of text may be necessary to fit the space available.

1989-90 N.Z. NATIONALS REPORT

from John Ryan

½A Combat

With 9 entries, plenty of action was assured. Right from the first heat Tim Baxter and Paul Merrilees set the standard with non-stop action. Paul Coghlan, Peter Williams, J. Robertson and Roger Jones all flew exciting bouts, with Williams, Wellington and Merrilees flying off for first, second and third. Great flying, with plenty of entertainment value.

Goodyear Team Race

Due to the wind, 3 x 2-up heats were flown in each round. Times were slow, with 5:28.3 by Brian Howser being the fastest time recorded in round 1. In round 2 a 4:27.2 by Lewis & Coghlan was the only sub-5 minute time. Lewis-Coghlan, Howser and the Palmer team lined up for the final. All went well until Lewis-Coghlan caused an infringement to the Palmer team and Paul stepped into the flight circle to retrieve his model. A protest from the Palmer team resulted in Lewis-Coghlan being disqualified and the final being reflown between the Palmer team and Brian Howser. Disaster struck for Howser at the first pitstop when Peter Williams had trouble at take-off and completed only ¾ of a loop, resulting in the destruction of Brian's model and engine.

½A Team Race

Eleven flew, and although times were generally slow, lots of fun was had by all and good standards prevailed. The old master, Alan Barnes, showed all how it's done in the final with a rapid 8:47.0, followed by Coghlan and the Palmer team.

F2B Aerobatics

Rounds 1 and 2 were held on 30/12/89 in a very strong wind. In Round 1 Bill Forbes and Don Burt kissed the ground and John Ryan just led Alan Lawrence. In round 2 Alan reversed the order and Don improved his score. Round 3 was flown the following day, with Sandy Sanderson flying only one round, as the wind increased in strength. Lawrence and Ryan broke props on take-off so their 3rd round scroes were 10. Best two flights put Lawrence 1st, Ryan 2nd and Sanderson 3rd.

Novice Aerobatics

Eight flew, with the top 6 being very close. Models ranged from large stunters to Peacemakers and an APS Princess. Nigel McAnelly has now promoted himself into FAI with two excellent flights from a fine model. Cameron Hay, a junior from Ashburton, did very well with a Super Tigre diesel powered Peacemaker to take third place and Top Junior; a great effort. Peter Williams split them for second.

New Zealand Combat

Ten flew, with some bouts decided by time on the ground rather than cuts in the air. Notable flyer was Don Burt with diesel powered wings ending up equal 3rd. This man just loves Combat and Aggy, and reminds us of a certain old North Island gent with similar afflictions. (Could Don Burt and Ron Norton be twin brothers?)

FAI Combat

This had only four entries, and once again Peter Williams dominated the other entrants Richard Dalziel, Paul Coghlan and J. Robertson. All provided plenty of entertainment.

Speed

FAI Speed had five entries and was won in convincing fashion by Alan Barnes with a terrific 13.67 sec/km (263.35 kph), which was 0.47 secs under his own NZ record. This was achieved using his own home-built ABC engine. Second was Brian Howser with 14.21 sec/km and third was Nev Low with 15.95 sec/km.

In Class 1 Speed (2.5 cc) the tables were turned, Brian Howser winning with 14.00 sec/km (257.14 kph), only 0.05 seconds away from the record, followed by Alan Barnes with 14.40 sec/km using his Rossi. Third was Nev Low with a slow 17.00 sec/km.

In Class 2 Speed (3.5 cc), another NZ record fell when Alan Barnes did 13.90 sec/km (258.99 kph) to go 0.07 seconds under the record which he set in November. He used his Rossi 21 and asymmetric sidewinder model. Second was Paul Coghlan with 18.50 sec/km and third was Nigel McAnelly with 24.10 sec/km.

In Class 3 Speed (5 cc), Paul Coghlan was first with 16.51 sec/km, followed by Brian Howser with 16.97 sec/km from his ST X29 Class B T/R model.

Dave Sanderson was the only entry in Class 4 Speed, and he did 20.93 sec/km.

There were no entries in Class 5 Speed (jet).

FAI Team Race

This event was the highlight of the week, with some of the most exciting racing seen in years. Eight flew, and with new FAI rules in effect, three rounds were flown. Some rapid times were turned in as follows; P. Williams 4:01.6, 3:55.8, 4:15.0; Elder-Low 3:54.0, 4:12.4, 4:18.9; Lewis-Coghlan 4:22.6, 4:08.7. The final was very spectacular, with all three up at the drop of the starter's flag. However, the Williams and the Lewis-Coghlan models collided on landing at about 140 laps, which left the Elder-Low team to blaze home in 7:59.4.

Old Time Stunt and Midge Speed

These events were run by the Vintage Technical Committee. Both had good entries with lots of action in Midge Speed. Des McAnelly topped the scores with 83.1 mph.

CL Scale

This also had a large entry, with Dave Sanderson, Alan Lawrence and John Ryan retaining 1st, 2nd and 3rd, as last year.

Classic Team Race

Classic wound up the week's events, with three Class A models and one Class B. A quick trial was arranged with the B on Class A lines, and the result was that it was no faster than an Oliver powered Miss FAI. Two x 2-up heats followed, with every rule in the book broken and amended. After a protest from the crowd, which was upheld, a 4-up final followed, with Ricky Bould's Footprint finishing just 5 seconds in front of John Ryan's Miss FAI. Adrian Wellington, assisted by Paul Coghlan and numerous others, came home third with a Keil Kraft Demon. Sandy Sanderson's Max 29 powered B withdrew after 100 laps with control problems.

What a great week it was, with excellent flying sites and back-up from the Wigram Group. There's no doubt about it, CL is alive and well in the South Island, and well run events resulted, with entrants well prepared and ready to fly when called. Also encouraging was the number of juniors competing. It was great to meet many of the South Islander we've read about for years.

IMPROVED SHEET STUNTER

by Leon Baird

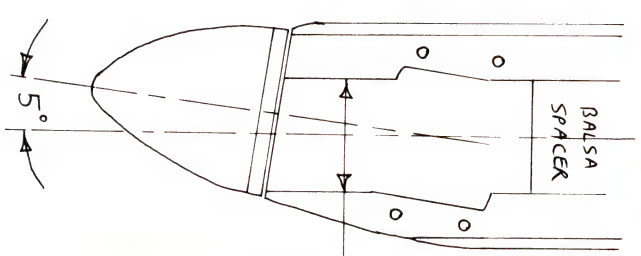
This article is an update on the latest changes, refinements and improvements to the sheet wing stunter concept, as introduced to me by Frank Coombes in Airborne No. 59, 1983, and the plans that were part of that article. Having been associated with Frank for a long time, I have been fortunate enough to see the gradual development of the flat plate aerobatics model right from the beginning.

Quite a few examples have been built by various people over the years, and nearly all of them have been highly successful. The couple that were less successful had badly warped wings, developed a tank leak or tried using too small a bellcrank and small horns. I enjoy watching the amazed expressions on the faces of the uninitiated as they gaze upon one of these models flying a very presentable FAI aerobatics schedule in the hands of a good pilot. Make no mistake readers, if built correctly, with a suitable 2.5 to 3.5 cc motor, you too can fly or learn to fly aerobatics with one of these simple models. Don't worry about the wings bending during manoeuvres, as this is normal, and be ready to whip the model around after the engine cuts to assist with the glide.

I want to tell you about the most important considerations and changes that have been developed over the years, because there were a few accidental omissions from the original plans, as Frank will acknowledge. Firstly, no engine offset was shown, yet this has been found to be very important for adequate line tension, especially with the smaller engines. About 5° out-thrust is needed. (Figure 1 shows how it is done. Simply join the engine bearers to the balsa spacer 4 mm closer than the crankcase width of the engine so that crankcase clearance cut-outs can be made at an angle. If the bearers are too far apart, mounting holes can end up beyond the edge of the bearer. To avoid the model having a funny cranked nose it is possible to camouflage the 5° offset by making the inboard cut-out much deeper than the outboard, and adding sheet balsa to the width of the nose on the inside. In other words, the motor crankcase is biased inboard of the fuselage centre line except at the spinner. By carefully shaping the nose and building up with balsa at the right locations, you can make the offset less noticeable.

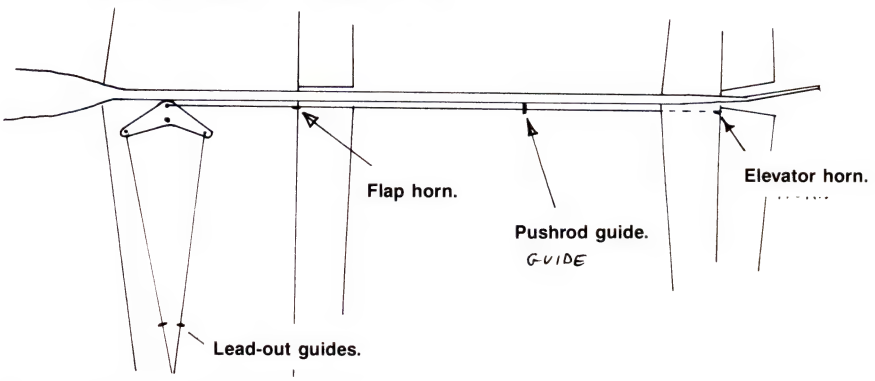
Secondly, a pushrod guide is needed to prevent the pushrod from flexing under load. We use

Figure 1. Revised engine installation



Bearer spacing is 4 mm less than crankcase width.

Figure 2. Revised control system plan.



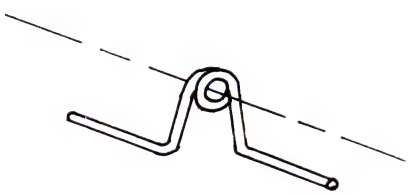


Figure 3. Pushrod guide.



Leon Baird's customised sheet stunter originating from the designs by Frank Coombes. See test for details of the changes. Decoration is with coloured tissue, another Coombes speciality taken up by Leon.

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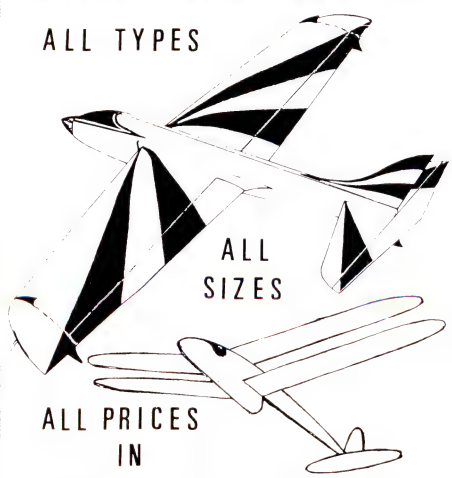
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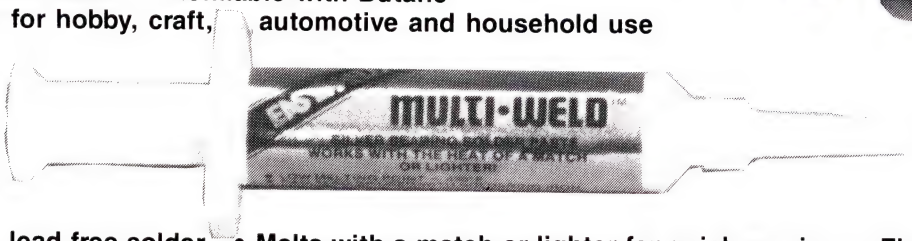
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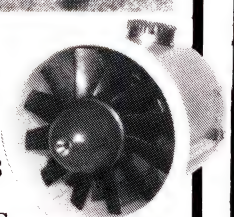
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Kite and Wales

by Iain Kirley

CONGRATULATIONS — 100 NOT OUT

After contributing to only a few issues, I must congratulate Merv and John for doing such a good job for the readers. This issue, being a milestone for the magazine - Issue No. 100, highlights the acceptance of the magazine by Australian modellers. The space made available to the yachting fraternity is appreciated. The number of letters and phone calls I have received in the last few months shows that the information is encouraging a number of past sailors to re-enter the sport. Congratulations for the first 100 issues, and all the best for the next 100 plus.

Thank you Iain. We hope that you stay with us too!

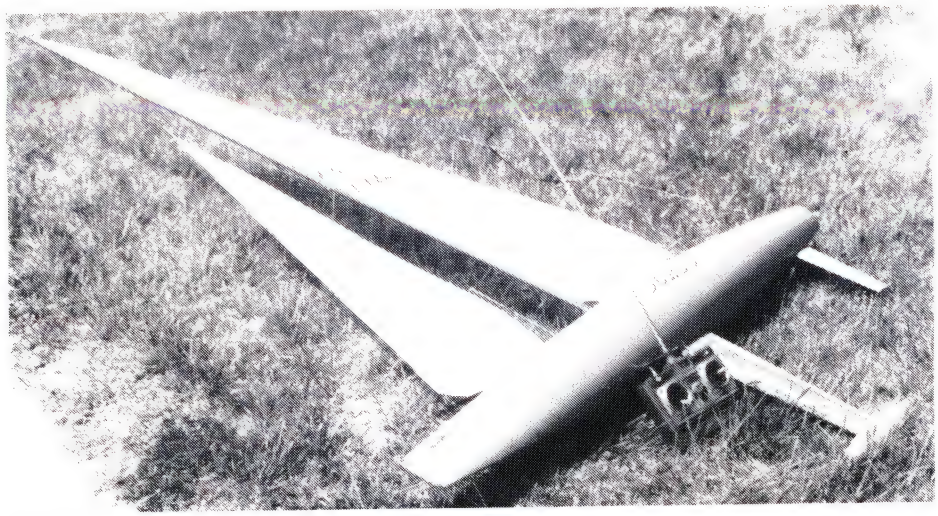
Light conditions for RMs at Bowen Park in Canberra. Whose boat can you identify? Pic from the columnist.

COMING EVENTS

Monaro Cup RA Class Match Racing
July 28-29 at Lake Bonney, South Australia.

Victorian RA Match Racing Competition
Sept 2 & 3 , probably at Albert Park Lake.

Nationals
January 3 to 13 1991 at West Lakes, Adelaide. Entry forms available from Rob Guyatt, 66 Radford Road, Angaston, SA, 5353; phone (085) 64 2444



A Frank Russell designed Zero by Phil Page. Plan available from AIRBORNE. I.K. photo.

N.S.W. A CLASS CHAMPIONSHIPS

This year's event followed the same format as last year's in that it was held over two rounds. The first was conducted at Bicentennial Park, Homebush, in Sydney and the second at the Canberra Club's sailing venue at Bowen Park in Canberra. The Monaro Club's normal sailing venue was not available due to construction activity and problems caused by recent rain.

There were 9 entries: 5 from the Bicentennial Club, 2 from Monaro and 2 from Canberra. The designs also varied, and included a Highlander, an Alien, a Venseremous, a Souxie, a Trolleyjack Mk1, a Vapour Trail, and Alien Mod and two Aquilas. Sails used came predominantly from the lofts of Jim Bradshaw (WA) and Graham Bantock (UK), with a few home-made sets. Seven of the yachts used Guyatt electronic or mechanical winches, with the other two using Futaba S110 winches.

The fleet was not large so just one fleet could be sailed. The number was reduced to 8 when I took over as OOD for the second round. Fourteen races plus an informal race were completed by 3.30 each day, including a 45 minute lunch break.

Round 1. The wind was moderate and consistent, and by the end of the day Paul McGilvray was in the lead after a string of high finishes. Paul was followed closely by Milton Saville, Wayne Swinnerton, Bill Kirwan, Matthew Saville, Bruce Kennewell, Les Swinnerton, Iain Kirley and Ray Bennett.

Round 2. This started off in similar fashion, with moderate winds and no rain. However, as the day continued the wind became patchy, and at one stage the leaders were running in moderate winds and the tail-end boats were becalmed. Both Paul McGilvray and Bill Kirwan used their local knowledge to the fullest, with the two con-

sistently finishing first and second. The remainder of the fleet swapped positions constantly, depending on luck with the wind.

Results

1. Paul McGilvray	32.5	5. Matthew Saville	103.8
2. Bill Kirwan	58.6	6. Les Swinnerton	118.1
3. Milton Saville	71.7	7. Bruce Kennewell	121.1
4. Wayne Swinnerton	85.1	8. Ray Bennett	163.0

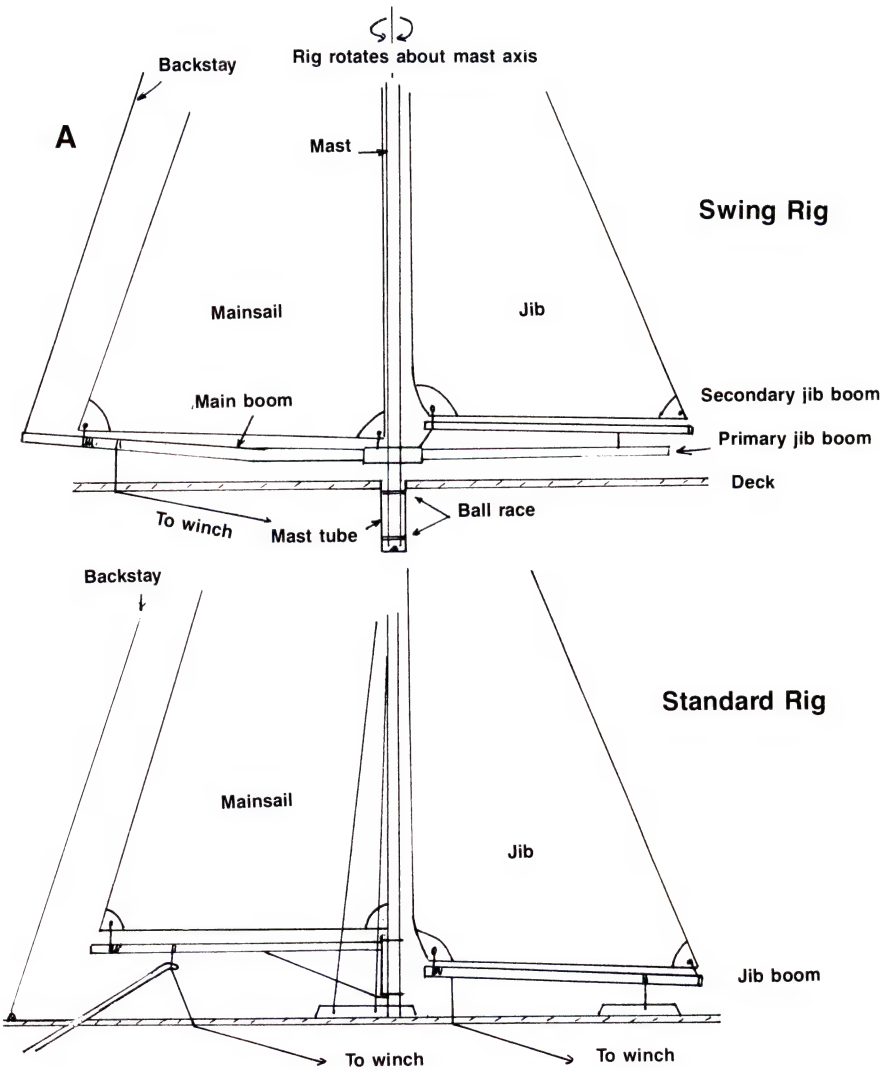
The event was enjoyed by all, with no protests. There were a lot of 720 penalties by Ray Bennett, and plenty of laughs and sportsmanship. One fact that was learnt, and this applies to flying planes as well, is that it is important to watch where you are walking. One intrepid skipper, who will remain nameless, walked off the edge of the bank and into the lake in Sydney. Luckily he was wearing waders and the water was shallow, or he may have had problems!

WHAT IS A SWING RIG?

I had a letter from a reader in Queensland who had read about a Marblehead yacht with a swing rig instead of a normal mast and jib fitting, and he wanted to know the diffference. A swing rig is basically a rotating mast fitted with a fixed boom and fixed jib boom. The original concept of the swing rig was developed in Britain by Roger Stollery during 1981 but its full potential was not fully recognised till the British RM Nationals in 1983. Further development has been undertaken by both Roger and Graham Bantock. Since 1983 swing rigs have found their way from the RM class into the 36 inch (1 metre) class and, to a limited extent, the R10R class. There have also been a few reports that the system has been tried on the RA class. I do not know if they have been a success.

The illustrations show: A. comparison of a swing rig and a standard rig; B. comparison of both rigs on a boat as viewed from above on a beat; and C. from above on a run. One of the main benefits of the swing rig can be seen in illustration A, where there is only one mainsheet line, as it controls the angle of the rig to obtain the optimal angle of the sail to the wind direction to drive the boat forward. A normal rig has a main and jib sheet to control the sails. Another advantage is that in the Marblehead class you can change rigs in one to two minutes with a swing rig, rather than the five minutes needed with a standard rig. The slot (offset for the jib) is a simple adjustment between the secondary jib boom and the main jib boom.

The critical factor of the swing rig is the placement of the mast tube in the correct location in the hull so that the centre of effort of the sail is directly above the centre of lateral resistance of the hull, as once the mast tube is fixed inthe hull it is permanent. As can be seen from illustration B, both the jib and main are capable of using the following wind to maximum efficiency, whereas the standard rig's jib can suffer from the effect of wind shadow from the main if not goose-winged; i.e. main to port and jib to starboard or vice versa.



INSTALLING RADIO CONTROL IN MODEL BOATS, by John Cundel. Published by Argus Books, Argus House, Boundary Way, Hemel Hempstead, Herts, HP2 7ST, England. £4.95 + 10• p&p.

This is one of a series of Radio Control Handbooks, intended to assist the beginner as well as bring the old hand up to date in various areas of modelling. As editor of Model Boats magazine, John Cundell is well qualified to cover the subject of radio control as it applies to boats, both powered and sailing.

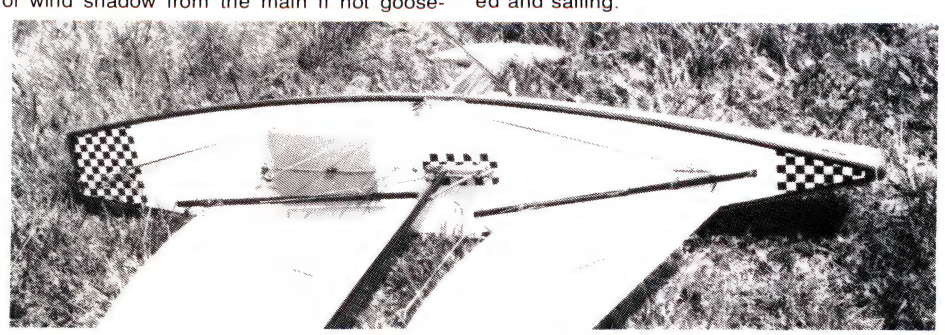
Chapter One starts by giving some of the history of control by radio and what these early radios looked like, and continues on to cover present day sets and what is most suited for a boat. A couple of pages are dedicated to frequencies, but these are not relevant to Australia.

From then on it goes into what one can control on a boat, and this is where there is a difference from other forms of model, as we boaties like to do a lot of thingswith our models,but most need only an on-off control and not proportional control, so usually a 2 or 3 channel set will do, with one channel operating a multi-position switch. A large number of pages are devoted to how and where to mount the receiver and servos, with special attention to how to keep the water out of the works, something with which most of us have to contend sooner or later.

Sail winches and speed controls are also covered, as well as how to set them up, and choosing and caring for batteries is also described. Finally, a list of Dos and Don'ts and a list of boating and accessory suppliers in the UK and the USA round off this useful volume.

At 62 pages it is a comparatively small book, but one which any model boat builder or, for that matter, prospective builder, should add to his library.

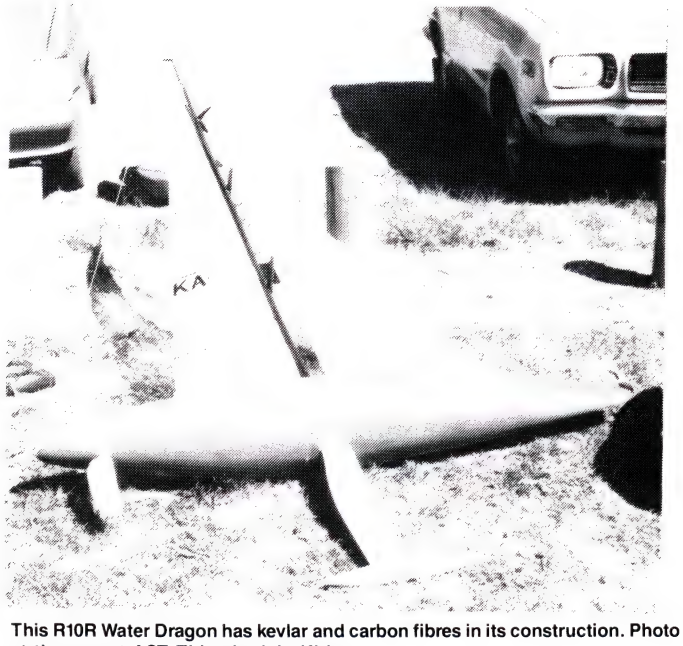
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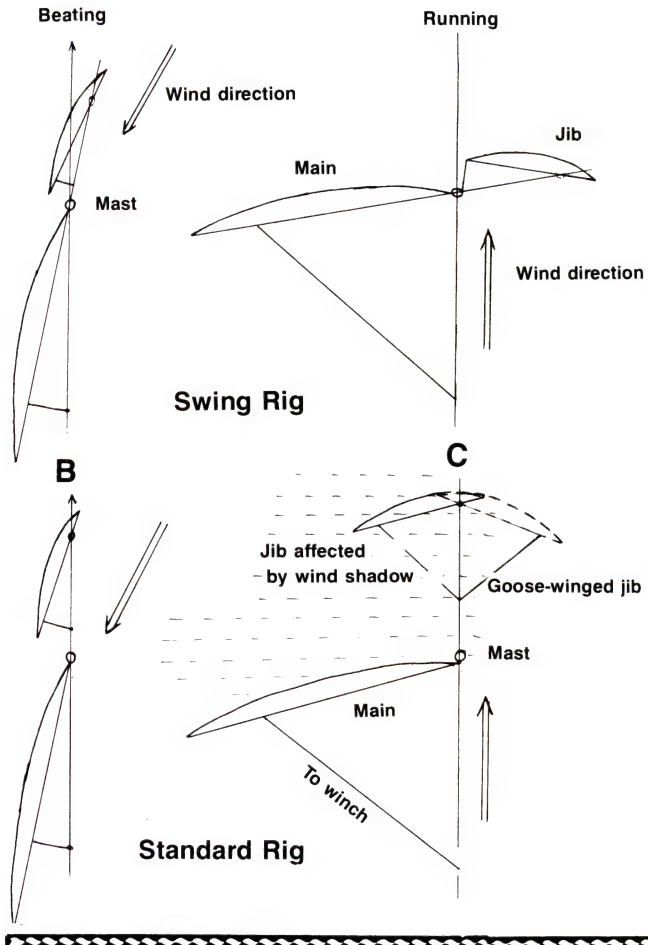
Deck of Phil Page's Zero. Nice workmanship is apparent.

ANYTHING FOR ME?

If you have any problems or tips for other skippers, then send me a copy and I will either answer the problem or pass on the tip. Photos of projects are also welcome. My address is: **Iain Kirley, RMB 431, Macks Reef Road, via Bungendore, NSW, 2621.**



This R10R Water Dragon has kevlar and carbon fibres in its construction. Photo at the recent ACT Titles by Iain Kirley.



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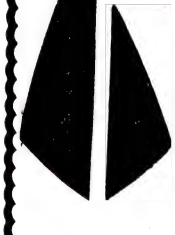
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THE MARINE SCENE

INDY DOWN UNDER

from Phil Allison

Oran Park Raceway, Sydney

Billed by hosts, the Sydney Model Powerboat Club, as "one of Australia's premier model boat meetings", the seventh annual running of the Indy attracted many interesting visitors. A veritable invasion arrived from Victoria, with six competitors, five of them on their first visit to the Indy. A strong contingent also arrived from Queensland, and many others from around NSW, as well as members of the SMPBC itself.

For those who haven't heard, the Indy is five-lap heat oval racing, held over the Easter weekend, for any type of boat with engine(s) up to 35 cc capacity. Heats are arranged for six competitors without regard to the type of baot entered. Points are awarded according to an elapsed time system, making this a race against the clock. Any inequality between boats is compensated for in practice by the fact that there are NO trophies. Instead, each driver in turn, according to their placing, has a pick of a table covered in prizes at the end of the event. This year the prizes on offer included engines, hulls, accessories and vouchers from various sponsors connected with the sport. All much more useful than a fancy door stopper!

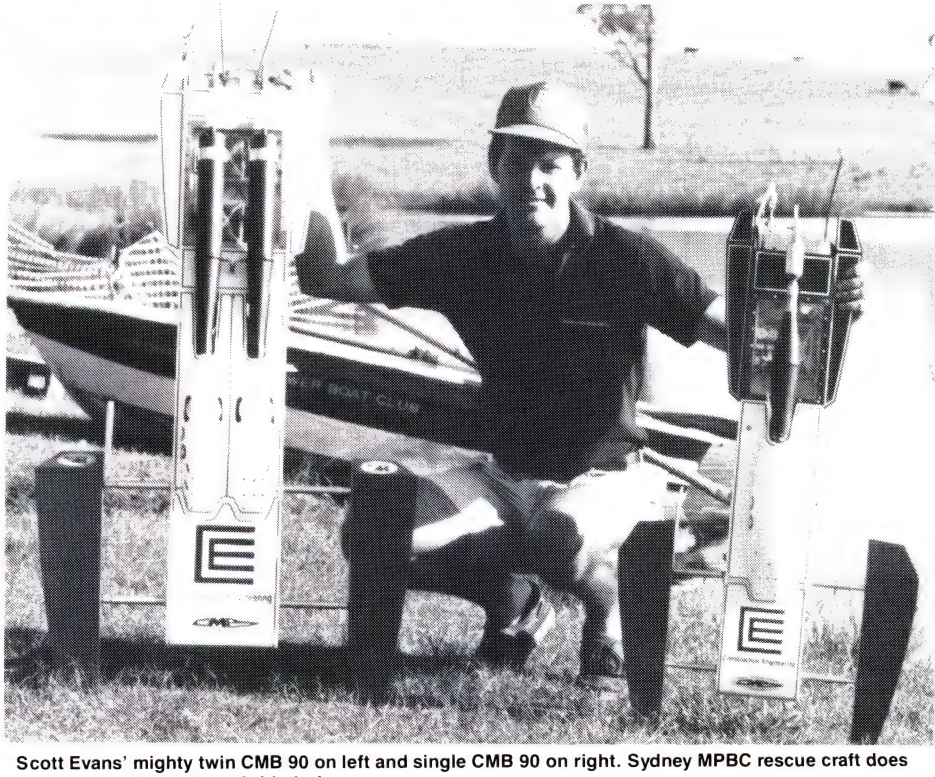
The practice session on Good Friday was in fine and hot conditions, which deteriorated to cool and showery by Saturday. Racing went on regardless and without serious incident on the water.

Scott Evans from Victoria entered a most impressive looking twin engined hydro (see pic) featuring 2 CMB 90 Grand Prix Marine engines. It was quite an attention grabber on and off the water. Unfortunately, reliability problems prevented Scott from completing all but two of his six heats. However, two very fast times were recorded, one of them an Indy heat record.

On Easter Sunday the weather was fine, mild and calm; excellent boating conditions which made for fast, consistent racing, especially from the leaders. Regular progress reports from the computer (courtesy of Andrew Young, SMPBC) let everyone know just how well or otherwise they were doing. It was a 'battle of the states', with Victorians, Queenslanders and New South Welshmen vying for the lead.

When the last heats had been run, the weather again appeared to be failing and there was a sense of urgency as the prize table was quickly loaded and the computer furnished the final placings. Contest director, Bob Black, called the winner's name, and it was Victorian Tony Ricciotti who was first. Tony cooly chose his prize after the traditional bathing ceremony in the lake! Second place went to SMPBC member Phil Redhouse, and third to Queenslander Dennis Beresford.

All thirty five competitors were able to choose a prize, even those unlucky enough not to finish a single heat. No one went away empty handed. All concerned reckoned the seventh Indy to be a great success. Tony Ricciotti's score sets a new record for this event, and a target to beat next year, same time, same place.



Scott Evans' mighty twin CMB 90 on left and single CMB 90 on right. Sydney MPBC rescue craft does not have 1/3 the power of this lot!



Tony Ricciotti won first place with CMB 90 powered Stinger Corsa hydro. Simple lines and reliability, combined with good driving.



Phil Redhouse with OPS 15 cc engine in big tunnel hull was second place-getter. Below decks view of two tanks, radio box under pipe and cone shaped after muffler.

Results

1.	Tony Ricciotti	Vic	CMB 90	Hydro	1140
2.	Phil Redhouse	NSW	OPS 90	Tunnel	1113
3.	Dennis Beresford	Qld	Picco 90	Tunnel	1110
4.	Brian Hardy	NSW	OPS 45	Tunnel	1064
5.	Greg Carter	Qld	OPS 90	Tunnel	1057
5.	David Garrard	NSW	OPS 45	Hydro	1057
7.	Brian McKellar	NSW	OPS 67	Tunnel	1054
8.	John Dennis	NSW	OS 81	Tunnel	1047
9.	Brian McAllister	Qld	OPS 45	Tunnel	1045
10.	Rob Wilson	NSW	OPS 45	Hydro	999
11.	Stewart Thornton	NSW	Picco 80	Mono	921
12.	Russ Tillyard	Qld	OS 81	Tunnel	830
13.	John MacKenzie	NSW	OS 81	Tunnel	829
14.	Ken Cunningham	Vic	OPS 90	Tunnel	816
15.	Bill Annabel	Qld	Picco 90	Hydro	659
16.	Adam Clarke	NSW	Picco 90	Tunnel	625
17.	Rob Newman		90	Tunnel	623
18.	Phil Allison	NSW	OPS 40	Mono	571
19.	Barry Craven	NSW	OPS 45	Mono	540
20.	Steve Winks	NSW	OS 81	Hydro	481
21.	Scott Evans	Vic	2 x CMB 90	Hydro	464

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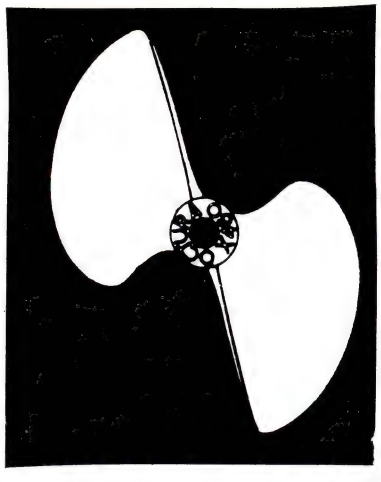
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Tunnel		
7.5 cc	Murray Hunter	Melbourne
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3.5 cc	Murray Hunter	Melbourne
7.5 cc	Craig Chenco	Melbourne
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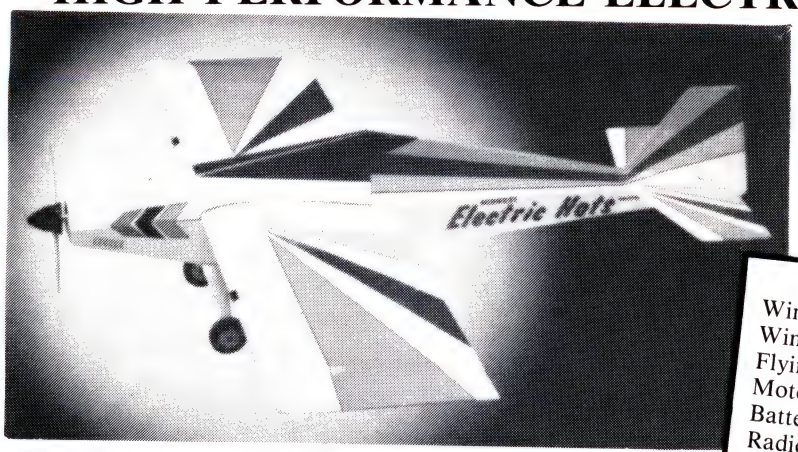
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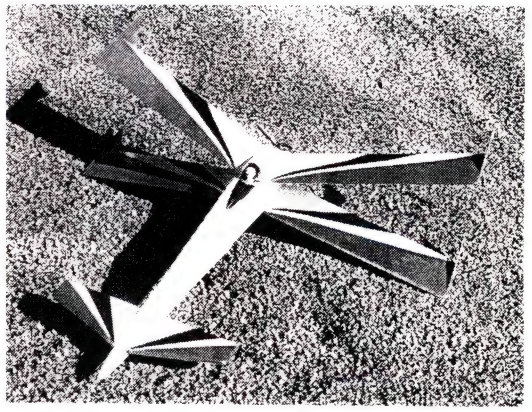
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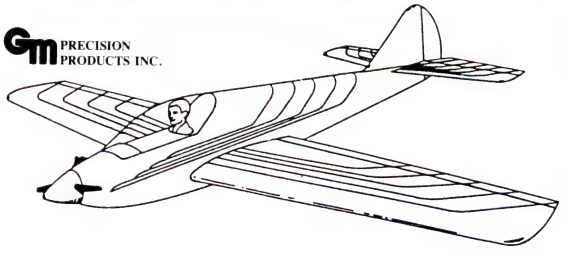
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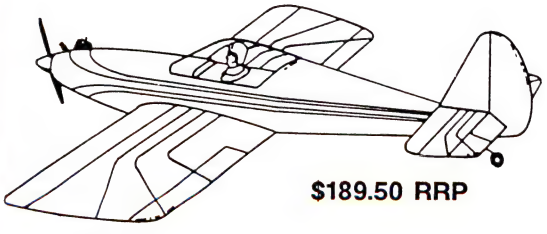
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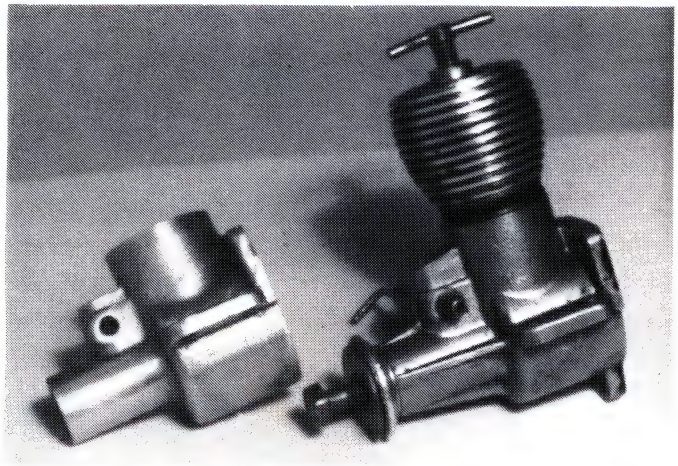
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AUSTRALIAN PRODUCTION MOTORS — Part Three

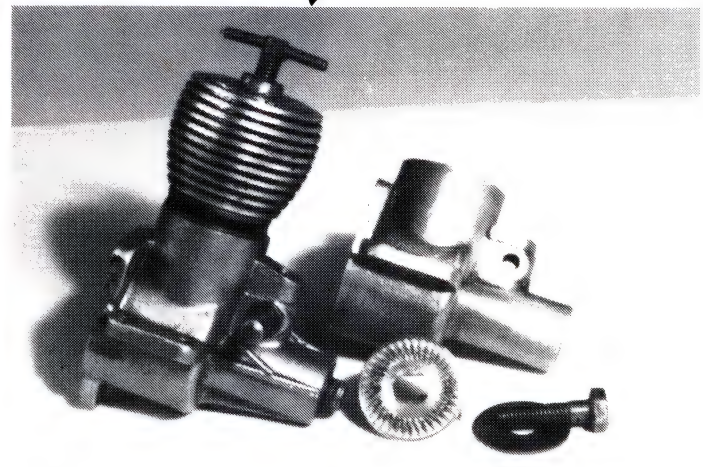
The Sabre Story

by Ivor F

Photography by Ron McDuie.



Picture 1. The Mark 1 Sabre. Design finalised for prototype late in 1949, with production under way by mid 1950. The crankcase at left has been mutilated by removal of the bottom mounting lug. Beam or radial mounting (or both) was provided. Gordon is producing a very limited re-run, replicas being available only from him.



Picture No. 2A. The Mark 2 Sabre with the prop driver removed to show the 'Hornby train set' drive disc; i.e. two curves and 2 straights to fit the crankshaft. This is very prone to being hammered loose by repeated firing strokes. Gordon did not use this method thereafter.

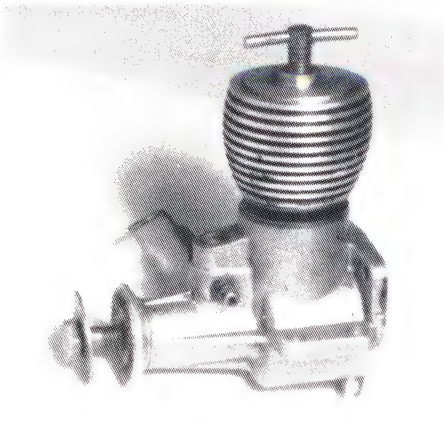
Dating SABRE motors presents a problem because no recorrds now exist of actual dates of commencement, production or release. Gordon's first motors were marketed under the GEE BEE trade mark. Unfortunately for Gordon, he had not registered this trade mark. To his surprise, he learned thru a solicitor's letter that the trade mark had been registered by his retail agent, and he, Gordon Burford, was not, without permission of the holder, to advertise eny products under the name Gee Bee. To add to Gordon's difficulties at the time, the agent had become financially over-committed and could not pay for the motors alredy supplied. Gordon cut his losses, and in mid 1950 stopped producing the Gee Bee line and marketed his first 2.5 cc diesel using the new name, SABRE. Gordon has neither confirmed nor denied that the word was an acronym for South Australian Burford Reciprocating (or Racing) Engine. As an earlier article in Australian Modeller pointed out, both model engine and full-sized manufacturers have always shown a penchant for naming their creations after deth-dealing things, both natural and otherwise. A few examples will suffice: Whirlwind, Wasp, Viper, Venom, Javelin, Cutlass, Rapier and Dart; so Sabre can be placed in the same category; vide Gordon's later choice - Taipan - a deth-dealer in excelsis.

The copy of the new name went to press in September-October 1950, and appeared in No. 6 of Australian Model Hobbies, which was to produce only four more issues before its demise. The engine shown in Picture 1 is quite rare, in that it has no crank case webs and the venturi is flat. Very few examples were made, and it is unlikely that more than half a dozen are now in existence. My collection does not have one, and an offer of a brand new replica is hereby made for one. The Mk 2, shown in Picture 2, is also rare. The advertised price was 99/6 which is approximately $300 in 1990 money. This motor did not have the name Sabre on it, and earlier articles have, as a result, excluded it. It is quite clear that Gordon's intention was to call each motor by a different name, following the lead set by Bill Atwood and adopted by Allbon and ED, but that he later changed his mind. The motor in its Mk 1 version was sent to Laurence Sparey who reviewed it in the May 1951 issue of Aeromodeller. Sparey's example peaked at .225 BHP, which Sparey described as "in the super class". The Mk 2 test is printed in Model Aircraft January 1953.

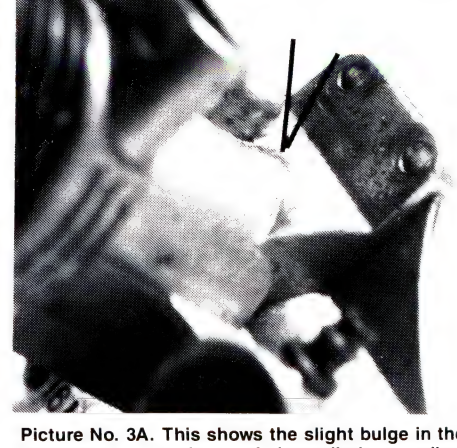
The first Burford motor to actually bear the name Sabre is the four-screw hed and backplate Sabre .29, shown in Picture 3. This motor is based hevily on the 1952 Veco .29, including the pronounced step behind the venturi marking the bottom of the cylinder liner. For the first time Burford began stamping serial numbers on his motors. Total production was probably about 700, although numbers as high as 1600 have been seen.

There was no .35 version, and there are no factory variants except one difficult-to-detect crankcase modification. After the first 100 or so it was found that the conrod at maximum deflection would, in some examples, scrape the inside of the case. The die was modified with a slight bulge externally. If you have one without this bulge you have a very rare motor.

At this stage Burford was 32 years old and at the frenetic peak of his drive to produce different designs and capacities. He could, and did, produce complete crankcase dies in a weekend. Several different sizes would be in production at the same time, and the order of release is not certain. For what it's worth, the best gestimate is that the Sabre .49 two ringed eight crankcase screw motor was next. Mal Sharpe, VH-5, placed second using one in C Class Team Speed at the

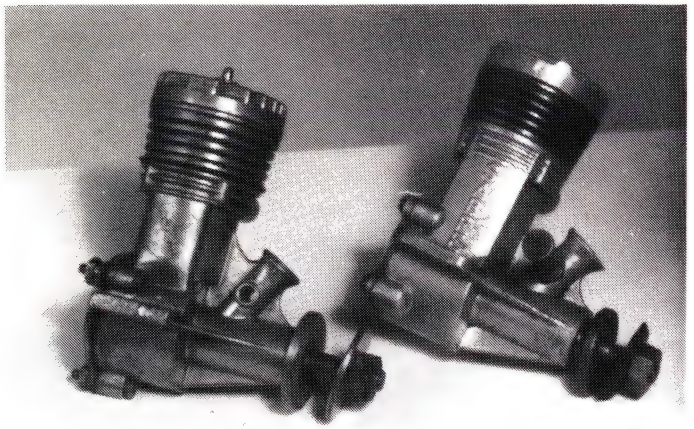


Picture No. 2. The Mark 2 version with sloped intake and crankcase webs, also shown in Picture No. 1. Still no embossing of name nor capacity on crankcase, This was late 1950.

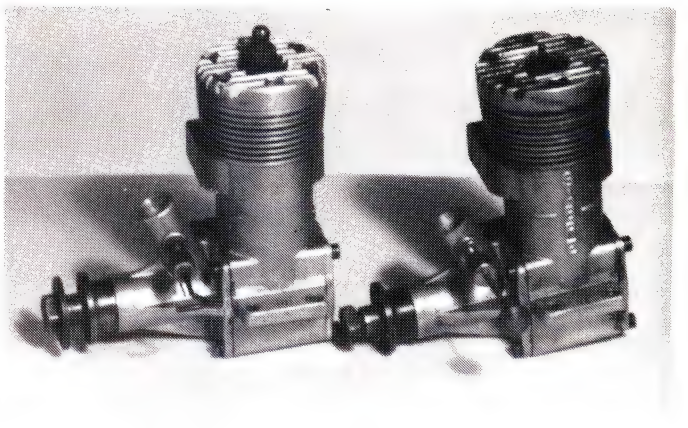


Picture No. 3A. This shows the slight bulge in the crankcase at the base of the cylinder to allow internal clearance for the con rod.

Protect your privilege to fly model aircraft; Join the MAAA; Join an MAAA affiliated club.



Picture No. 3. The first motor to actually carry the name Sabre on it was the 29. Note the similarity to the Veco 19. If you have one please forward the type of motor and the number stamped on it to Box 11, Doonside, 2767.



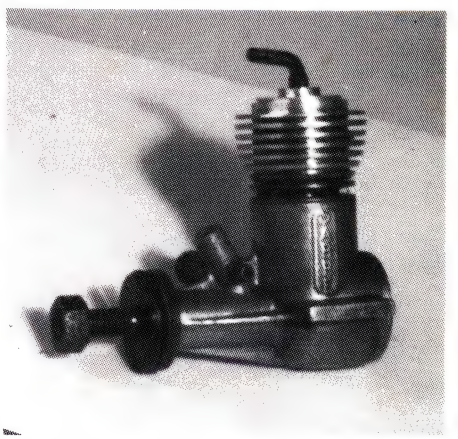
Picture No. 4. The Sabre 49 Mark 1 and Mark 2. Produced approximately June 1951. Gordon produced a twin ball race front end for this motor but did not release this version. Mark 1 cases were produced from Castaloy, which was highly recommended, but Gordon was very disappointed.

Xmas 1951 Nationals held at Camden. The first marque has no name and no capacity on it. Mk 2 has both. As well, the backplate of the Mk 1 has a wall .125 inches thick. In the Mk 2 this is reduced to a nominal .050 which, in some examples, after the inevitable scraping by the conrod big end, comes down to less than .030; a bit thin perhaps. Most Mk 1s had a cast iron bush in the main bearing housing; Mk 2s have a bronze bush. Another difference is the crankshaft web which, in the Mk 1 is a nominal .125 inches. In the Mk 2 this is increased to .145. In some shafts the counterweight is ground away; in others it is left as machined. The piston is unusual for a Burford motor in that it, like the hed, front end and backplate, is a casting. This was standard US practice for baffled-ringed-piston motors. The rings were actually made by Repco; the smallest they ever made. This was Gordon's first ringed motor. His next and last was twenty years down the track. The last known variation was the rod, which in the Mk 1 is round, and in the Mk 2 is machined flat.

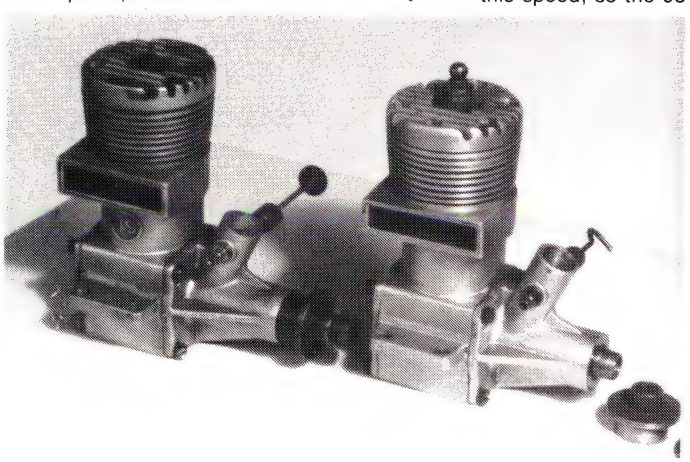
At about the same time as the .49, Gordon planned to market a 1.5 cc diesel. Overseas the trend was to smaller motors, and this was reflected in the very high volume sales of the Elfin 1.49 and Frog 150. Gordon made a dozen 1.5s of the type shown in Picture 5. It can be seen by looking at the photo, that Gordon was influenced by the Atwood Wasp. The motor was advertised by the new agent, Australia's Hobby Centre, but no counter sales were ever made, and Gordon did not proceed. He could not make the motor profitably for less than 105/-, and the English Frog, probably the highest volume 1.5 cc diesel of all time, retailed for 77/6 in Australia. Well known modellers like Basil Healy (VH 9) and Monty Tyrrell (VH 13) had these Burford motors. Basil lost his at the 1953 Nationals at Toowoomba. Eny knowledge of eny of the remaining ten would be much appreciated. My example, 001, came from Gordon who recovered it twenty years after it was produced, trading a new-in-box Taipan .60 for it.

Picture 6 also shows the Atwood influence in the 2.5 quadri-spherical case Sabre which can probably be dubbed Mk 3, although Gordon believes that he did not release it until later. Picture 7 shows the Mk 4 Sabre 2.5. No crankcase mods are known, but variants include plain hed, anodised green or red hed, heds with or without flats to accept a spanner for tightening, and hexagonal or round liner as shown. Flown on .006 lines of only 36 ft length, which the rules allowed, one of these was credited with 98 mph at an MFC of A Championships at Schofileds Naval Air Station in 1955. Stan Pilgrim, flying a Midge speed model and using a 1.5 cc motor of the 1950s era, on .010 42 ft lines, recently emulated this speed, so the 98 mph is quite credible.

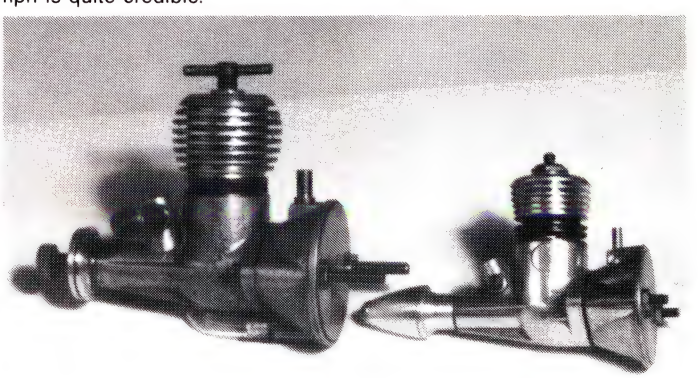
Picture 8 is the Sabre .19 based hevily on the K&B .19 which Jack Dunkerton (VH 8) sent to Gordon. Jack at the time was hed of the NSW MAAA and interested in Australian products



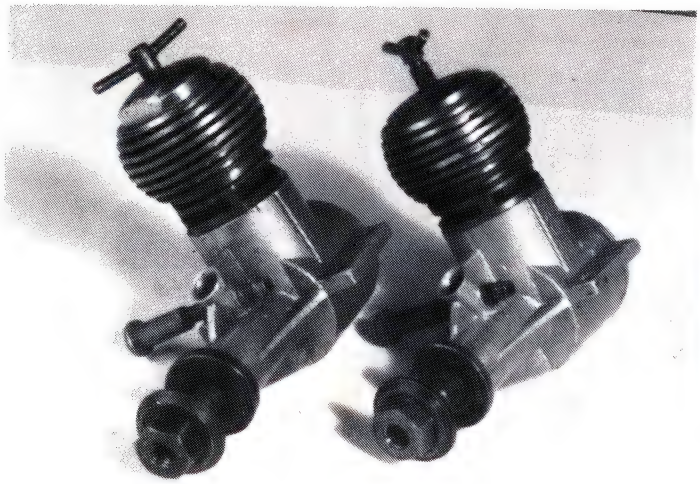
Picture No. 6. The Sabre 2.5, still showing the influence of Bill Atwood. Gordon made only two motors with quadrispherical fronts to the crankcase. This is the last of them. The style is wasteful of material and die making time. The result is just not crisp enough to please all but a few. Where are you in this hierarchy?



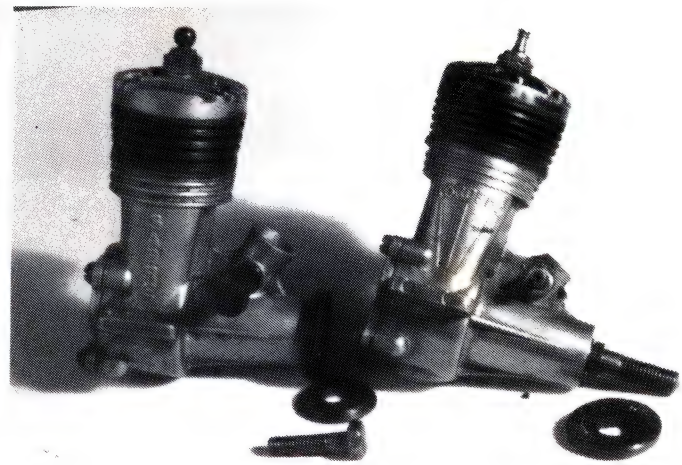
Picture No. 4A. The Sabre 49s again showing the exhaust sides and the different style needles. The first versions were made from bike spokes, which were easy to bend but not truly round. They were abandoned for No. 3 harness and saddlers' needles. See text.



Picture No. 5. The Sabre 1.5. Note the similarity to the Atwood Wasp 049. This Sabre is a very rare Mark. It used the first of Gordon's 'in house' castings. He taught Peter Willis, from the TAA Cargo staff, engineering techniques, and he became a superb craftsman in the art. Where is Peter now?



Picture No. 7. The Sabre 2.5 Mark 4. Note the flats on the hed, and hexagonal liner. One of these flew at a mesured 98+ mph at Schofields airport in 1955 on 0.006 inch lines.

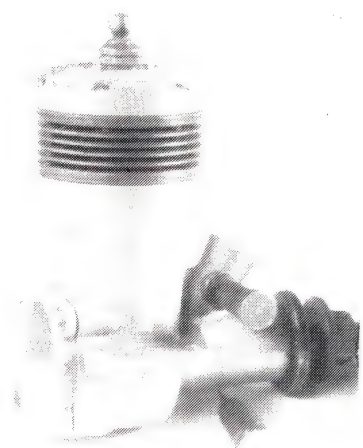


Picture No. 8. A Sabre 19 and K&B 19 nose to tail. The influence of the American engine is obvious. The circles on the lugs of the K&B are from pressure die casting. Gordon didn't use this method until 20 years later and promptly went bankrupt. Moral: do what you know best.

being up there. As a result, the Sabre .19 was recognised as being, if enything, better than the K&B. It sold 1200 or so, and was easily the most financially successful of the Sabre line.
The Mk 1 has only the stud shaft with D washer. The fillets are narrow in plan view and finish clearly inside the bearer lugs as can be seen, compared to photo 9, which is the modified version. Some Mk 2s were fitted with the short shaft with screw-in stud. Other variations included a separate venturi insert, round hed or cheese hed screws, thick fins with narrow spacing, and vice versa, the number of the fins and the overall height remaining the same. The only factory fitted needle valve assembly was that shown with bent wire click spring. The needle itself is a standard 16 gage saddle-needle, minus the eye, about which there's a story worth repeating.

Burford was the world's largest buyer of these needles, using in a fortnight what a saddler would use in a lifetime. The manufacturers were curious, and when their English rep was in Australia he made a point of a special visit, not to the Tenterfield saddler, but the Henley Beach one. He was quite fascinated at this unexpected use of the company's product. Burf took the opportunity to ask if he could have the needles in bulk, preferably without the eye. The man made a note of it and sed he'd see what could be done. Several months later Burf received a letter telling him that he could have them without the eye, and in bulk, not threded into cloth in packs of twelve. The only snag was the price, which would be doubled! Gordon went back to individually depacking each needle, placing it point down in a block of steel with a .070 hole drilled in it, and breaking off the eye with a hammer.

The next Sabres released were the .29 and .35 in Pictures 10 and 11. They were also the last of the line to have the name Sabre on them and, since a legal injunction is what it is, I will call the last two in the line transition Sabre-Glo Chief. *(Gordon had to relinquish the name Sabre because it was claimed by an overseas aviaton company, although Gordon had lodged his claim for it first. Its ratification was then delayed by legal procedures so that a protest could be made by the counter claimant, even though that was made after the specified dedline. If you have a Burford Sabre you may tell the story!)* Picture 12 shows the first of these with no name and an aluminium muff replacing the integral fins. We would like confirmation that it was released as a .35 as well as a .29. The last of the line is shown in Picture 13. It was intended to be marketed as Sabre Mk 3. It came out with the new style waisted type needle and a splined shaft, the first time that Gordon used this method. This marque with gold hed became the 1958 Gold Top Glo Chief.



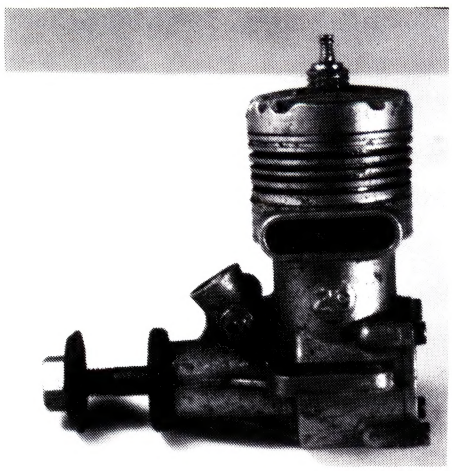
Picture No. 10. The Sabre 29, the last Burford motor of the 50s era to carry the name Sabre. However, it may not be the last as legal injunctions are not eternal. Watch for the 2.5 Mark 1 replica: it may have what the original did not!



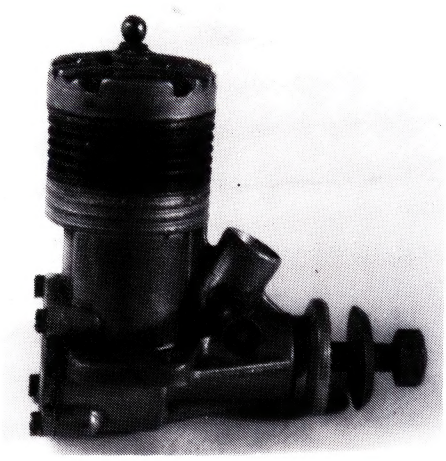
Picture No. 9. Sabre 19 Mark 1 and Mark 2 showing the different webs of the Mark 2 on the right. Some Mark 2s had the stud shaft, most had the through shaft. A Mark 1 with a through shaft is not ex-factory.

**Photo No. 11.
The Sabre 35, but the name dropped due to legal injunction.
A transition engine, as another name had to be found. The story about the name Sabre is told in AIRBORNE No
Copies of the issue are available on request.
Note the separation line of the cylinder muff, the only Burford motor with this feature.**

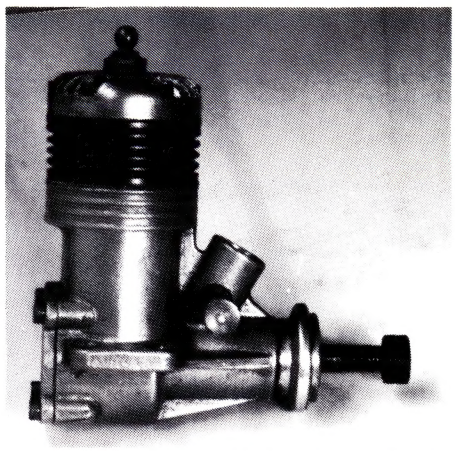




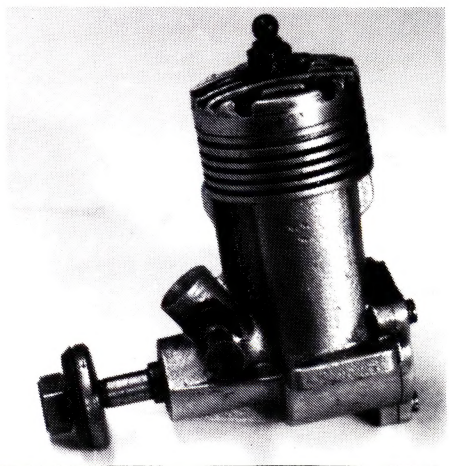
Picture No. 12. The exhaust side of the Sabre 29 with the ED 2.46 type separate cylinder muff. The fins are easier to machine on the separate muff than fins integral with the cylinder barrel, but are not as effective. Do you have a 35 version?



Picture No. 13. The last of the Sabre line had a cast cylinder hed and parallel sides to the external wall of the transfer porting. A few changes to the Mark began another name and another story.



Top right: Picture No. 13A. A factory hybrid 29 with Glo Chief gold anodised hed and aluminium prop washer.



At right: Picture No. 14. The last Sabre with a three stud backplate, waisted needle and steel strip click spring. Influence from the Fox 29 and 35 is clearly evident. This motor was released as the Glo Chief Mark 2 in 1958.

Photographer, Ron McDuie, VH913, is one of the elite band of Australian aeromodellers who are still actively modelling in their seventies. Ron was President of the NSWAA in the 1950s, and, only last year, made the front page of the Sydney daily papers when his A1 glider flew about 50 kilometres from the flying field and landed on a tennis court!

This article deals only with Gordon Burford's SABRE motors, and purports to be definitive; i.e. there are no others.

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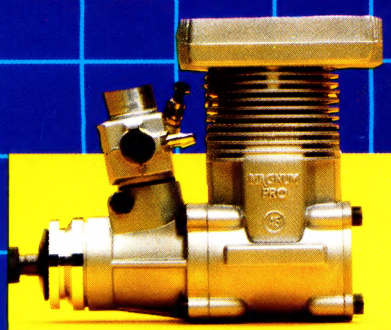
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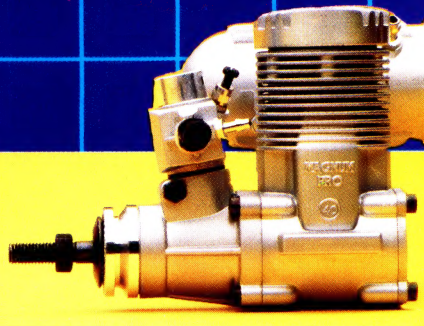
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